



FRIDAY, DECEMBER 21, 1894.

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Contributions.

Rating Train Loads by Weight.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Answering A. B. C. in your issue of Nov. 30, I would say that I have in a number of cases known of the tonnage basis being virtually adopted for train loading with good results, though not after the method he suggests. The weather, the direction and character of traffic bring in the question of personal judgment on the part of superintendents and train and yard masters so that individual common sense and experience would have to make the final ruling in each case, even with a systematic record of the loading in tons of each car.

Checks can readily be established to have merchandise loading made comparatively uniform, and aside from merchandise proper there is but little trouble in knowing from the character of the loads whether the train should contain more or less cars. An examination of the daily train sheets will give an intelligent trainmaster or superintendent a close enough idea of how the engines are being loaded so that all concerned can be educated in a comparatively short time.

In some cases I have known of special men being put on for short periods to watch, check and remedy any local short comings in engine loading, and the result was always satisfactory, the local men soon becoming aware of what was needed. This leads me to think that engine loading can be properly regulated by those in charge locally without need of a highly developed method of checking car tonnage. Personal judgment would finally have to determine each case.

The cost of any special examination to discover weak points and the application of proper remedies would, I think, be much less in the long run than the detailed tonnage calculations recommended by A. B. C. The records of the car accountant and freight auditor can be readily made use of if occasion demands and will give valuable aid in pointing out any existing trouble. Every blank form or report the use of which can be avoided should be done away with, and no added complication made in clerical work unless the gain through decreased expense or increased revenue can be very clearly proved.

Z. Y. X.

The Nicaragua Canal.

JACKSONVILLE, Fla., Dec. 17, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have received your last paper with article on the Nicaragua Canal, and am much interested in it. You take a very wise view of the matter. It would, in my opinion, be very unwise for the United States to commit themselves to the construction of the canal without more extended examinations of the country than have yet been made.

I am ardently in favor of a canal to unite the now divided portions of our great country, and a canal to be owned and operated by Americans, as I believe every patriotic American citizen is, but in a stupendous undertaking like this it would be very unwise to commit the Government to any route until all other routes had been thoroughly explored, and with the knowledge that I possess of the present location and of other routes, I feel that I would be derelict in my duty to my country if I did not speak, before it is too late, and call the attention of the Government to the fact that a route exists, much better in every way than the location adopted, and free from the great cost and uncertainty of a line through the stupendous rock cut of the divide, a line that would obviate all the numerous curves made necessary by the

location as at present adopted, and would reduce to a minimum the dangers attending the vast impounding of the waters in the artificial valleys formed on the line as now laid down.

Such a line is known to me, and I do not speak from idle fancy or hearsay, for I have personally examined and been over such a line, and am prepared to show and prove that the line I refer to can be built for at least \$10,000,000 less than the location now proposed, and be much more direct, and no longer, while it is free from the uncertainties attending the excavation of a canal in a rock cut over 300 ft. in depth. The cutting on the line that I refer to will not exceed 10 ft. above the water line.

It is not my intention to throw any discredit on the surveys that have been made in Nicaragua, which have been executed with the greatest thoroughness and fidelity.

I was for a long time charmed with the ingenious project of the gifted engineer who was my chief, but this is a question of dollars and cents to the American people, and should be thoroughly discussed and the ground carefully looked over before a location is adopted. If this had been done before proceeding to elaborate plans of location, the \$4,000,000 or \$5,000,000 already spent by the Nicaragua Canal Construction Co. would not have been thrown away, as, in my opinion, it has been.

J. FRANCIS LE BARON.

The Physical Condition of Atchison.

The report of Mr. Robert Moore on the physical condition of the Atchison properties, which was submitted Dec. 1, is a very valuable document and one of primary importance in considering any plan of reorganization. Mr. Moore is so sound and judicious an engineer that his estimate of the requirements of the properties will be taken with much confidence. On the 8th of December he sent to Mr. R. S. Hayes, the Chairman of the Reor-

adequate for the present demands of traffic, and fully up to the standard of railroads in the same region, as shown by the returns to the Interstate Commerce Commission. But in order to comply with the requirements of the United States Statute of March 2, 1893, in regard to automatic couplers and continuous train brakes, compliance with which is assumed, a large expenditure will be required during the next three years, or before Jan. 1, 1898. The amount needed for this purpose is included in Table II.

4. That in addition to the foregoing there are other expenditures for new terminals, extensions, double track, etc., which will be desirable in the near future, particularly upon the return of prosperous business conditions, but which may be deferred until then without damage to the property as it now exists. A few of these are set forth in Table III.

TABLE I.—AVERAGE ANNUAL COST OF RENEWING RAILS.

Division.	Miles of Main Line.	Average Annual Life of Rails.	Average Annual Renewals.	Rate per Mile Laid in Track, Including Fastenings.	Average Annual Cost.
Atchison, Topeka & Santa Fe.....	4,582	20	229	\$3,600	\$824,400
Gulf, Colorado & Santa Fe.....	1,050	19	55	3,600	198,000
Atlantic & Pacific (Western and California Division).....	818	18	45	3,800	171,000
Southern California.....	470	20	23	3,800	87,400
Colorado Midland.....	240	12	20	3,800	76,000
St. Louis & San Francisco.....	1,328	19	70	3,500	245,000
Totals.....	8,488	19½	442	\$3,710	\$1,601,800

NOTE.—In the mileage of main lines a portion of the unimportant branches and all sidings are excluded.

TABLE II.—IMPROVEMENTS REQUIRED DURING THE NEXT SIX YEARS FOR THE PRESERVATION OF THE PROPERTY AS IT NOW EXISTS.

	I.	II.	III.	IV.	V.	VI.	Total.
	A. T. & S. F.	G. C. & S. F.	At. & Pac.	Southern California.	Colo. Mid.	St. L. & S. F.	
Ballasting and widening banks.....	\$600,000	\$790,000	\$550,000	\$180,000	\$390,000	\$514,500	\$3,024,500
New bridges.....	1,750,000	150,000	113,800	160,000	80,000	91,000	2,344,800
New buildings.....	540,000	75,000		50,000		30,000	793,000
New sidings.....	150,000				20,000		170,000
Additional water supply.....	66,000				13,000		79,000
River protection.....	108,000				13,000		121,000
New terminals.....						555,000	555,000
Rails in excess of ordinary renewals			1,706,200				1,706,200
Miscellaneous.....	160,000				50,000		210,000
Remodeling freight equipment.....	1,095,000	172,500	110,000	12,500	41,100	510,000	1,940,100
Totals.....	\$4,469,000	\$1,187,500	\$2,480,000	\$402,500	\$705,100	\$1,700,500	\$10,389,600

TABLE III.—IMPROVEMENTS NEEDED FOR THE DEVELOPMENT OF THE PROPERTY UNDER PROSPEROUS BUSINESS CONDITIONS.

	I.	II.	III.	IV.	V.	VI.	Total.
	A. T. & S. F.	G. C. & S. F.	At. & Pac.	Southern California.	Colo. Mid.	St. L. & S. F.	
Second Track.....	\$1,275,000						\$1,275,000
Reducing grades.....	142,000	\$160,000					302,000
New terminals.....	1,740,000						1,740,000
Extensions.....			\$2,100,000	\$2,500,000			4,600,000
Totals.....	\$3,157,000	\$160,000	\$2,100,000	\$2,500,000			\$7,917,000
Total of Tables II. and III.....	\$7,626,000	\$1,347,500	\$4,580,000	\$2,902,500	\$705,100	\$1,700,500	\$18,306,600

ganization Committee, a summary of his report, which gives his conclusions in such compact form that we reprint it in full, following it with extracts from the body of the report, which was, as we have said, submitted a week earlier.

SUMMARY.

Summing up the results of the foregoing investigations we find as follows:

1. That whilst the several properties embraced in the system show every evidence of intelligent care on the part of the management, and are in their condition up to ordinary standard of roads in the same region, the amount of money spent has not been equal to the average annual amount necessary to fully maintain the property.

This is specially true in regard to the rails and the longer span wooden bridges. The ties and the minor wooden bridges are as a rule well maintained. The average annual cost of rail renewals based upon the probable expectation of life in each case, is given in the first of the following tables. In one case, that of the Atlantic & Pacific, the amount required for renewals of rails during the next six years is so much greater than in the average annual amount that the excess has been included in the next table.

2. That a number of permanent improvements—included in Table II.—will during the next six years be needed in order to preserve the property as it now exists. Chief amongst these is ballast, large amounts of which are needed on all divisions. Expenditure for this purpose is important, not only to facilitate the movement of trains, but also to reduce the repairs to machinery and prevent the unnecessary destruction of rails. Another large item of this class is the replacement of long span wooden bridges with structures of iron on masonry supports. In a number of places, also, a considerable expenditure will be required to protect embankments at bridge approaches and at other points against destruction by water.

3. That the rolling stock on the system as a whole is

The total mileage of the Atchison system is 9,344 miles, of which Mr. Moore inspected 6,192. In his investigation and report he endeavored to ascertain and state with regard to each main division of the system, the actual condition of roadbed, track, buildings and machinery, as well as the expenditures required to put these divisions in such condition that the ordinary expenditures, including any operating expenses, will suffice to maintain them there.

The Atchison proper, embracing 4,582 miles, is first considered. About half of this mileage may be classed as lines of light traffic, ranging down in some cases almost to zero. In addition there are nearly 700 miles of siding, being about 15 per cent. of the main track mileage. The lines of this system have nearly all been built to a high standard. The location and grade are good, cuts and fills of ample width, bridges and buildings usually of a high class, except that there are many wooden truss and trestle bridges where permanent structures should have been used.

Since construction, 1,120 miles, being the greater part of the heavy traffic lines in the rainy region, have been ballasted. A large part of the remaining length of line, 3,400 miles, is in a dry climate where ballast is not essential, but the standards of track worn have been good and as a rule the cuts are well ditched, the roadbed clean and the track in good line and surface. The exceptions, of which there are many, are mostly due to the fact that the rails are too light and too much worn for the service.

From the Chief Engineer, Mr. Dunn, a schedule of the rails in service has been obtained, from which it appears that there are 485 miles of iron rail all under 56 lbs. There are 1,671 miles of steel rail of 50 and 52 lbs., 1,471 miles of steel 57 to 61 lbs., and 803 miles of steel 66 to 71 lbs. The iron rails have an average age of 15.5 years, some of them having been in track 23 years. The steel rails have an average age of 8.2 years, only 11 miles having been laid as much as 16 years ago. Much the

greatest part of the steel rails has been laid within eight years, 2,355 miles having been laid in 1887 and subsequent years. The larger part of the rail is of rather light section, namely one-half; that is, 2,347 miles, varying from 35 to 52 lbs.

One important fact in this branch of the investigation is that in the five years from 1890 to 1894 inclusive, the total renewals have averaged but 81 miles a year; but assuming 25 years as the life on lines of light traffic and 15 on lines of heavy traffic and that these lines are about equal, we get 20 years as the average life of the rails of the whole system, which would make the proportionate annual renewal 229 miles; the actual renewals having been but a little over one-third of this rate. Little, if any, harm has, however, been done so far, but a large indebtedness to the renewal fund has been incurred and the rate of renewals must hereafter be greatly increased.

There are 82.1 miles of pile and wooden trestle bridges all in good condition. The recent renewals and replacements of these structures have been up to the average annual amount needed to maintain them. Of iron bridges there are 283, aggregating 6.38 miles long. A few of these are not up to the present standards, but the Chief Engineer fully understands their needs. There are 143 wooden Howe truss spans, mostly on wooden piers, aggregating 4.27 miles, nearly all of which are well advanced in years and will soon need complete renewal.

The rolling stock is sufficient in quantity for present requirements. Painting has been somewhat neglected, but otherwise it is in good working order, but a considerable expenditure will be needed to meet the requirements of the United States law in regard to continuous brakes and automatic couplers, although this sum is much reduced by the fact that the greater part of the freight cars already have air-brakes. The Superintendent of Machinery estimates that \$1,094,500 must be spent for this item before January 1, 1898.

The terminal grounds and tracks are, as a rule, adequate. Station houses and other buildings are generally good. Several engine houses should be enlarged, and certain machine shops will soon be greatly needed. The terminals in Chicago and Denver will need pretty heavy expenditure, say \$240,000 in Denver and perhaps a million and a half in Chicago, although this latter item is very conjectural.

The Gulf, Colorado & Santa Fé is divided into 694 miles of heavy traffic lines and 356 of light traffic. As a rule this line was well located and the standard of construction, though not of the highest, was fully on a par with other Texas lines of equal importance. There is one section, however, from Cleburne to Dallas, built by another company, on which the alignment is very bad and the grade very broken, with maximum of 79 ft. A not very heavy expenditure would much better the grades and line here.

There are 55 bridge structures, aggregating 1.68 miles, built in iron, and 1,775, aggregating 31.13 miles, in wood. The wooden trestle over Galveston Bay, 2.11 miles long, is very expensive to maintain because of its rapid destruction by the teredo. This ought to be replaced by a permanent structure or concrete piers. Many of the remaining trestles should be replaced with stone arches or iron pipes, but there are many others, perhaps the majority, which may properly be maintained as they now are. All of the wooden structures appear to be in a thoroughly safe and satisfactory condition, and the ties to be well maintained. The rails are in many places badly damaged by surface bending, owing to the muddy soil and lack of ballast and will never make a good track. About 326 miles of the road have been ballasted from time to time, but the work has not been very well done, not enough material having been put in in some places, in others the banks not having been made wide enough. This work of ballasting should be continued without interruption, and for its completion about \$790,000 will have to be spent, which should be distributed over not to exceed six years. Station houses and rolling stock seem to be in good condition and adequate, but here, as on other divisions, a good deal of money must be spent before January 1, 1898, for brakes and couplers.

The Indian Territory Line of the Atlanta & Pacific Railroad, the portion called the Central Division, is 112 miles long, and construction was begun in 1873. It is well located and has good grades, the maximum being 61 ft., laid in long planes. As a rule the cuts are well ditched and the banks of good width. The ties are of oak and are well maintained, and the wooden trestle bridges are also in good condition. The larger bridges, mostly of iron, are in good order and the rails in a fairly good condition for light traffic, which is all that can be expected so long as the line remains a mere spur. Mr. Moore recommends, however, that it should, as soon as possible, be extended southwestward to a junction with the Southern Division of the Atchison. This could be done in 110 miles at a cost probably of a little over two millions.

The New Mexico & Arizona Division is well located, but it was not built to a high standard; the cuts and banks are both too narrow. There are seven iron bridges and viaducts, and all the rest of the bridging, amounting to nearly nine miles, is wooden trestle, with the exception of one wooden span of 153 ft. This span and a few of the trestles should be replaced in iron. The rest may be maintained for the present in wood. On the whole the condition of these bridges is good. The ties are also fairly well maintained, although they are of pine and have a life of but eight years. Only about 80 miles of the line has been ballasted, but the conditions are such

that ballast is very much needed on 375 miles. The rails are almost all 56 lbs. to the yard, which is too light for the heavy grade, and they are now much bent and down at joints. Even with ballast these rails would not make a smooth track. The water tanks and buildings are in great need of paint, and their general condition shows too great economy. The rolling stock also begins to show the need of paint, but is in fair order otherwise.

On the California Division the bridges, of which there are nearly 5½ miles, are all wooden trestles and are in good condition. In many places it is better to maintain them in wood than to replace them with iron, because of the treacherous channels which they cross. The track is not ballasted, but except to prevent dust, ballast is hardly needed. The rails are in very bad condition; they vary from 50 to 60 lbs. in weight and have been in service an average of 12½ years.

The Southern California includes, as published in the annual reports, 491 miles of main track, but 17 miles of this was washed out in 1891 and has not been rebuilt. The lines actually operated amount to 471 miles, with about 82 miles of sidings; that is, one-sixth of the main track mileage. The system consists of a rather complicated network of lines lying largely in fertile country with a good terminus at Los Angeles and occupying a region in which the maintenance of the railroad is easy. The road is nearly everywhere in good condition. Ballasting has been begun in a small way, but there is at least 150 miles more that should be done. The bridges are nearly all wooden trestles, there being eleven of them, and these are probably the best structures for the country owing to the shifting channels. There are, however, 23 spans of wooden Howe truss 1,736 ft. long in all, which should be replaced in iron. The rail is 61 lbs. and is in good condition.

Mr. Moore thinks that a system of short branch lines should be carried into the fertile valleys, and Mr. Wade, the General Manager of the road, thinks that 50 miles of such line should be built each year for the next five years in order to hold the territory. This can be done probably for two millions and a half.

Of the Colorado Midland, Mr. Moore considers only 274 miles, the rest being maintained by the owners. Going west from Colorado City there are about five miles of which the maximum grade is 4 per cent.; elsewhere the rolling grade does not exceed 3 per cent. The sharpest curvature is 16 degrees. Naturally, this is a line on which the wear of rails is very severe, but the maintenance has been well attended to as a matter of necessity. Still, about 45 per cent. of the original ties are used in the track and heavy renewal will have to be made here very soon. There are 4.57 miles of pile and trestle bridges, of which only 588 ft. have been renewed or replaced in 1894. This is not enough for their maintenance. There are 1,667 ft. of wooden Howe truss which should be replaced in iron within the next five years. There are 195 miles of main line and branches which ought to be ballasted at a cost, including the widening of banks, of \$390,000. The costs of other permanent improvements which Mr. Dun, Chief Engineer, thinks should be made, are given in the table printed above.

The St. Louis & San Francisco embraces 1,328 miles on which the standards of construction have differed widely. As a whole the system, with its steep grades and numerous curves, has the characteristics of a mountain line. The least satisfactory portion of the main line is the Kansas Division, where the grades are very much broken up and the banks are too narrow. About 512 miles of the railroad is ballasted and on the main lines this work now in progress should be hastened to completion. The estimate for the renewal of rails is given in the table above. The long span bridges are of iron except four which are combination; but thirty of these iron spans are on wooden supports, which should be replaced with masonry and the combination spans should be renewed. For these purposes \$91,000 should be spent without delay. Increased terminal facilities at St. Louis are greatly needed and the permanent improvements, to the amount of \$1,700,000 shown in the table printed above, should be made promptly. In fact the General Manager thinks that they should all be made within the next 18 months.

Debs Sentenced to Imprisonment.

Judge William A. Woods, in the United States Circuit Court at Chicago, Dec. 14, filed an opinion finding E. V. Debs, G. W. Howard, and seven other officers of the American Railway Union, guilty of contempt of court in disobeying the injunction issued by himself and Judge Grosscup on July 2, during the strike. Debs was sentenced to six months in jail, and the others, except McVane, to three months. The injunction, it will be remembered, forbade the men to interfere with trains in any manner. Judge Woods' main points follow:

The first half of the present decision is devoted to the question whether the court had jurisdiction. This is decided in the affirmative, under the Sherman anti-trust law of July, 1890, which declares illegal any combination in restraint of trade. A great body of evidence was presented, but the defendants refused to testify and offered no evidence in their own behalf, except parts of certain documents to explain other parts presented by the prosecution. Judge Woods holds that the interference with trains and mails was a nuisance, coming within the definition of that term in Blackstone's Commentaries, 3-216 and 4-166. Reference is also made to Wood on nuisances, pp. 107, 117; People vs. Vanderbilt, 28 N. Y. 396; New Orleans vs. United States, 10 pet.—United States—662; Attorney-General vs. Forbes, 2 my. & c. 123, and Kerr on Injunctions, p. 395. The Supreme Court of the United States has spoken on the subject, in the case of the Mayor of Georgetown vs. the Alexandria Canal Co. (12 Peters

91, 98), where an injunction was sought against obstructing the navigation of the Potomac River.

The defense insisted that the federal courts can do nothing to protect highways of interstate commerce in the absence of specific legislation by Congress, but it is held that the Interstate Commerce Law as amended in 1889 gives full authority. The injunction is also upheld on the ground of the Government's ownership of the mail bags. The claim that railroads are subject only to municipal regulation, that the owners of the road can protect themselves from interference, and that equity should not interfere, is answered by reference to the decision of the Supreme Court in Gilman vs. Philadelphia, 3 Wall, 713. The jurisdiction of the courts of equity and by implication their right to punish for contempt, are established by the constitution, equally with the right of trial by jury, and so long as there is no attempt to extend jurisdiction over subjects not properly cognizable in equity, there can be no ground for the objection that the right of jury trial has been taken away. The same act may constitute a contempt and a crime. But the contempt is one thing, the crime another, and the punishment for one is not a duplication of the punishment for the other. The contempt can be tried and punished only by the court while the charge of crime can be tried only by a jury.

The defendants claimed that the Sherman Law of 1890 was directed at capital and not at organizations of labor, but Judge Woods clearly shows the absurdity of this position. Will it be said that under this statute one who is not a capitalist may without criminality assist capitalists in doing things which are on their part criminal? If that be so, then if a capitalist and one who is not a capitalist join in doing things forbidden by this statute, neither can be punished, because one alone cannot be guilty of conspiracy.

The persistent effort of the defendants, as the proof shows, was to force the railroad companies—the largest capitalists of the country—to co-operate, or at least to acquiesce in a scheme to stop the use of Pullman sleepers; and for a time they had the agreement of a manager and other officers of one road to quit the use of the obnoxious cars, and, perhaps, a qualified submission of the officers of another road or two to the same dictation. Does the guilt or innocence of the defendants of the charge of conspiracy under this statute depend on proof of their success in drawing to the support of their design those who may be called capitalists?

As to whether the defendants violated the injunction Judge Woods says: Their original intention was only to prevent the use of Pullman cars, but finding that that aim would be thwarted by the discharge of men who refused to handle those cars, they began, as early as June 27, the day after the boycott was proclaimed, to issue orders to strike, and from that time to the end, to the extent of their ability, they conducted and controlled the strike with persistent consistency of purpose and with unvarying methods of action.

As officers of the American Railway Union it is beyond question that the defendants had practical control of the strike, guiding as they chose the movements of the men actively engaged. It was impossible that a strike which aimed at a general cessation of business upon the railroads of the country could succeed without violence, and it is not to be believed that the defendants entered upon the execution of their scheme without appreciating the fact and without having determined how to deal with it. The inference, therefore, is a fair one, aside from direct evidence to the point, that they expected and intended that this strike should differ from others only in magnitude of design and boldness of execution, and that the accustomed accessories of intimidation and violence, so far at least as found essential to success, would not be omitted. For that much the striking workmen, acting on the promptings of self interest, without instigation or direct suggestion, and even in spite of admonitions to the contrary, may ordinarily be counted on. Such admonitions against violence were sent out occasionally by the defendants, but it does not appear that they were ever heeded, and I am not able to believe on the evidence that in the fullest sense it was expected or intended that they should be. I am able and quite ready to believe that the defendants not only did not favor, but deprecated extreme violence which might lead to the destruction of property or of human life; but the chief aim, I am convinced, was to secure the good will of the public. To that end the warnings against acts of depredation or visible destruction of property, it may well be believed, were sincere, but their followers did not understand and the court cannot believe that it was intended to forbid intimidation and the milder forms of violence which did not directly involve the destruction of property or severe injury to person, and which for that reason, it seems, were assumed to be not unlawful when employed in the interest of organized labor in a contest with "an alliance of rich and powerful corporations."

The alleged advice of counsel neither justifies nor mitigates a wrong or error. No effort was made by strikers or members of the railway union to preserve the peace or to protect property. On the contrary many of them were leaders in scenes of violence and disorder. If this strike was understood to be a conflict between contending interests in which strategy had to be employed to keep the men in line, it was more than a peaceable strike.

It is shown by the testimony of two or more witnesses, that on the night of June 29, Debs and Howard and Keliher attended a meeting of the local union at Blue Island, on the line of the Rock Island road, that he and Howard each addressed the men, that on the next day was inaugurated a "condition of turbulence," which a witness declared he "did not believe could exist," and notwithstanding the efforts of the United States Marshal, by reading the injunction and otherwise, to quell the disturbance, nothing was accomplished until the 5th of July, when Federal soldiers arrived. These things directly followed, and in large measure, were the natural and probable result of the speeches made and counsel given to the men by Debs and Howard at the meeting on the night of the 29th, at Blue Island. Suggestions calculated to incite the acts of violence or intimidation were contained in many of the telegrams which were sent out over the name of Debs, and for which, notwithstanding the averment of their answers to the contrary, it is no longer possible for any of the defendants to deny some measure of responsibility.

The right of men to strike peaceably, and the right to advise a peaceable strike, is not questioned. But if men enter into a conspiracy to do any unlawful thing, and in order to accomplish their purpose advise workmen to go on strike, knowing that violence and wrong will be the probable outcome, neither in law nor in morals can they escape responsibility. The American Railway Union was committed to a conspiracy in restraint of interstate commerce, in violation of the act of July 2, 1890, and the members of that association and all others who joined in the movement, became criminally responsible each for the acts of others done in furtherance of the common purpose, whether intended by him or not. The officers became responsible for the men and the men for the officers. The original conspiracy against the use of Pullman

cars became a conspiracy against transportation and travel by railroad. Upon their own authority, without consulting the local unions, the defendants converted the boycott into a strike.

The Chesapeake and Delaware Ship Canal.

A committee consisting of General Casey, Chief of Engineers; E. P. Alexander, of South Carolina; Mendes Cohen, Past President Am. Soc. C. E., of Maryland; Geo. Dewey, Captain U. S. Navy, and Col. Wm. P. Craighill, U. S. Engineer Corps, President Am. Soc. C. E., was appointed by President Cleveland

"To examine and determine, from the surveys heretofore made under the direction of the War Department, the most feasible route for the construction of the Chesapeake and Delaware Canal; and
"In making such selection, to select a route which shall give the greatest facility to commerce and will be best adapted for national defense."

This committee has reported in favor of the Black Creek route, or virtually the line of the present Chesapeake & Delaware Canal. This canal, in common with all the other projected routes, was described at some length, with a map, in the *Railroad Gazette* of November 9. It is the most northern of all the possible routes, and is not only the most easily defended against foreign assault, but the most convenient for the internal commerce of the country. It is also the cheapest route on which to build the canal, and has only 13.63 miles of canal against 16.20 miles by the Sassafra route and 50.93 miles by Centerville, the route thought the most favorable to the export trade of Baltimore. But the estimated times of transit from Baltimore to a common point at sea 12 miles outside the Delaware Breakwater are: Black Creek, 17 hours; Sassafra, 15.1 hours; Centerville, 16.5 hours. This is on the basis of a speed of ten miles in open water, seven in dredged channels and five miles in canals. So that though the Centerville route is only 106.38 miles against 150.13 miles by Black Creek, and 129.25 by the Sassafra, the differences in times of transit when compared with a voyage to England or Europe amount to too small a percentage to be noticeable. The more Southern route, however, is thought less liable to obstruction by ice; for it is claimed that the disadvantages of the longer canal are offset by the fresh water ice that issues from the Susquehanna and, in cold weather, freezes into fields of considerable size.

The tonnage entered and cleared at the port of Baltimore, as returned to the commission by the collector of the port was in tons:

	1891.	1892.	1893.
Foreign	2,149,886	2,643,271	2,180,455
Coastwise, North	780,604	780,111	868,543
Coastwise, South	350,378	334,426	345,716
Totals	3,281,378	3,757,708	3,394,714

In addition to the above, vessels engaged in the coasting trade of Baltimore representing as much as 2,000,000 tons are not obliged to enter or clear at the custom house. Of these about 75 per cent. are said to go north. So that the north-bound coasting trade, which at present would use the canal, must be greater than the trans-Atlantic trade.

The Street Railroads of New York.

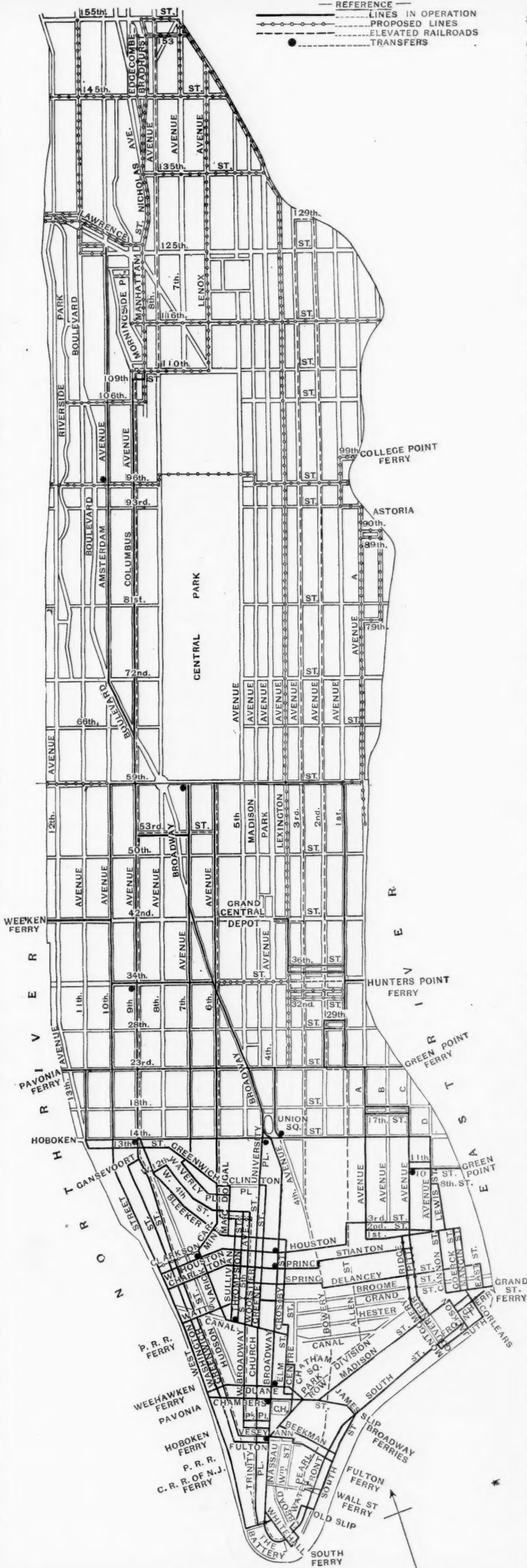
An element of prodigious importance in the question of the construction of a rapid transit railroad for New York has been introduced by the sudden enlargement of the efficiency and accommodations of the surface railroads. This is due not only to the change from horses to cable and electric power but to the great expansion of the transfer system, particularly on the lines of the Metropolitan Traction Co. We give a map on which the lines of that company, in operation and as proposed, are shown, with the points at which transfers can be made. On the same map the elevated railroad lines are given and the reader can see how thoroughly a very important part of the territory of the elevated system is covered by the Traction Co.'s lines.

A few weeks ago the New York Sun published an article on the development of the transfer system of the street railroads, giving some recent statistics with regard to the Metropolitan Traction Co.'s traffic, and in what follows we shall borrow freely from that article without further credit, adding facts from our own inquiries. It must be premised that transfers are made on some of the other systems. The Third avenue railroad, for instance, carries about 200,000 passengers a day and sometimes transfers 60,000 in a single Sunday, from its main line to the 125th street and 10th avenue line, but no other company has developed the system nearly as far as the Metropolitan.

This latter company now operates 120 miles of single track of horse car lines and 14 1/2 miles of single track of cable road. This is the customary way of reckoning street car lines, giving length of track. The backbone of the system is the Broadway cable line now in operation from the Battery to 59th street and on 7th avenue. Other lines operated by this company are as follows; over much of this great system the company now carries a passenger for 5 cents:

University place line: Grand street ferry via Grand and East streets, Bowery, Spring and Green streets, Clinton and University place and 14th street to Union square, returning via Wooster street instead of Green street and University place.

Columbus avenue cable: 110th street and Manhattan avenue south on Manhattan avenue to 109th street, to Columbus avenue, across the Boulevard to 9th avenue to 53rd street to 7th avenue, following the route of the Broadway Cable to South Ferry.



Street Car Lines and Transfer Points of the Metropolitan Traction Company, New York.

Seventh avenue line: From 59th street on Seventh to Greenwich, across Sixth, to Clinton place, to McDougal, to West Fourth, to Thompson, to Canal on Canal, to Broadway returning via Sullivan and West Third, instead of Thompson and West Fourth streets.

Sixth avenue lines: 59th street, along Sixth avenue to Carmine street, to Varick, to Canal, to West Broadway, across Chambers street, to College place, to Vesey street, to Broadway; returning via Church street instead of College place.

Sixth avenue and Amsterdam avenue line: Carmine street and Sixth avenue to 59th street to Ninth avenue, to Boulevard, to Amsterdam avenue, to 96th street.

Sixth avenue and Desbrosses street ferry line: Following the Sixth avenue line to Varick to West Houston to West to Desbrosses street ferry; returning via Charlton instead of West Houston street.

Ninth avenue to Fulton street: 125th street and Amsterdam avenue to Boulevard, to Ninth avenue to Gansevoort, to Washington, to Fulton street, to Broadway; returning via Greenwich instead of Washington and Gansevoort streets.

Twenty-third street line: From 23rd street ferry, N. R., along 23rd street to 23rd street ferry, E. R.

Thirty-fourth street ferry branch: 23rd street ferry, N. R., along 23rd street to Second avenue, to 28th street, to First avenue, to 34th street, E. R., returning via 29th street instead of 28th street.

Fourteenth street branch: 23rd street ferry N. R., on 23rd street to Eleventh avenue to 14th street ferry, N. R., along 14th street to Union square.

Bleecker street and Fulton ferry line: 23rd street ferry, N. R., on 23rd street to Ninth avenue, to 14th, to Hudson, to Bleecker, to Wooster, to Canal, across Broadway to Elm, to Reade, to Centre street, to Park Row, to Beekman, to South street, to Fulton ferry, E. R., returning via William, Ann and Leonard streets instead of South, Beekman and Reade streets.

Avenue C line: Grand Central Station on 42nd street to Lexington avenue to 36th street, to First avenue, to 23rd street, to Avenue A, to 17th street, to First avenue, to Houston, to West, to Chambers street ferry, N. R.; returning via West, Charlton, Prince, across Bowery to Stanton, to Pitt street, to Avenue C to 18th street, to Avenue A, to 23rd street to First avenue, to 35th street, to Lexington avenue to Grand Central Station.

Tenth street ferry branch: Same route as above from or to Avenue C and Tenth street; from Avenue C on Tenth street to Tenth street (Greenpoint) ferry. Returning from 10th street ferry on 10th street to Avenue D, to 11th street on 11th street to Avenue C.

Chambers street and Grand street ferry line: Grand street ferry, E. R., to East street, to Cherry, to Jackson, to Madison, to New Chambers, to Chambers across West street, to Pavonia ferry, N. R.; returning via Duane instead of Cherry street.

Chambers street and Roosevelt street ferry line: Roosevelt street ferry, E. R., through South street to James Slip, following the Chambers street and Grand street ferry line to Pavonia ferry returning via Duane instead of Chambers street.

Metropolitan Cross Town line.—14th street ferry N. R. line: from Grand street ferry, E. R., on Grand street to East, to Delancey, across

Bowery to Spring, to South Fifth avenue to West Fourth street, to McDougal, to Waverly place, to Bank street, to Greenwich avenue, to West 13th street, to 13th avenue, to 14th street ferry, N. R.

23rd street ferry, N. R., line: following the 14th street ferry line to McDougal street, to Waverly place, to Bank street, to Greenwich avenue, to Seventh avenue, to 23rd street to 23rd street ferry, N. R.

Forty-second street and Grand street ferry line: 42nd street ferry, N. R.; on 42nd street to Tenth avenue, to 34th street, to Broadway, to 23rd street, to Fourth avenue, to 14th street, to Avenue A., to First street, to Houston, to Cannon, to Grand to Grand street ferry, E. R., returning via Goerck, Houston and Second streets, to Avenue A., instead of Cannon, Houston and First streets. (Between 23rd and 34th streets every alternate car runs on 23rd street and on Sixth avenue, instead of on Broadway.)

Central Park, North and East River lines.—Crosstown line: 59th street and Tenth avenue, along 59th street to First avenue.

Eastern Belt line: 54th street on Tenth avenue, to 59th street to First avenue, to 53rd street to Avenue A., to 14th street to Avenue D, to Eighth street, to Lewis, to Houston, to Mangin, to Grand across Grand to Corlean, to Monroe, to Jackson, to Front, to South, to Front, to Whitehall, to South Ferry; returning via South to Broad, to Water, to Old Slip, to South, to Montgomery, to South, to Corlear, to Grand, to Goerck, to Houston, returning to 54th street and Tenth avenue over the route above.

Western Belt line: 53rd street on Tenth avenue to West street, to Battery place, to State, to Whitehall streets to South ferry; returning via Whitehall street and Bowling Green instead of State street.

In February, 1887, the first transfers were arranged. They provided for an interchange of business at Houston street and Broadway with the Avenue C line, and at Chambers street with the Chambers and Grand street ferry line. In the first month the number of transfers issued was 3,000 daily. Since that time the company has established 15 transfer stations, and a passenger can make changes in more than twice that number of directions. In fact, it is the company's purpose to enable passengers to change as often as may be necessary to use a fairly direct route to a given point. In 1888 the transfer business was in round figures 1,000,000 passengers. In 1889 the figures were doubled. In 1890 they reached 2,225,000, in 1891 2,500,000, in 1892 2,800,000, in 1893 3,150,000, and in 1894 7,000,000.

The enormous growth of the transfer business in the last fiscal year, month by month, is shown in the following table:

October.....	336,610	April.....	521,472
November.....	416,205	May.....	671,240
December.....	429,346	June.....	761,480
January.....	425,857	July.....	864,317
February.....	378,868	August.....	905,672
March.....	485,390	September.....	986,764

For the month of October, 1894, the transfers amounted to 1,046,025.

An enormous amount of this business has come directly from the patronage of the west side elevated roads since the opening of the Columbus and Amsterdam avenue routes. The temporary service of horse cars put upon Columbus avenue carried about 12,000 persons daily. Nearly all of these came from below 59th street and transferred there. These and others make a daily total of transferred passengers at 59th street from the Sixth and Seventh avenues and Broadway lines of nearly 25,000. Thirteen millions transfers a year is the present rate at which this one company is issuing them. One-half of this business is estimated by the company to be due absolutely to the system, and to consist of passengers who would not otherwise ride on these lines—perhaps not on any. This means an increase of half a million passengers a month, or about 4% per cent. of the total traffic.

The receipts for the new fiscal year, beginning Oct. 1, show an average daily increase over the receipts of the last fiscal year of between \$3,000 and \$4,000 a day. In other words, there were carried during the month of October, in addition to the million passengers who ride on transfers, between two and three million passengers more than the average for the last fiscal year. The increase in the net receipts is larger than the increase in the gross, for notwithstanding the larger number of passengers carried, the operating expenses have been decreased.

It has been suggested that the control of the Manhattan elevated system will be harmonized with that of the Traction Co., bringing about a system of transfers between the elevated and the surface lines. It has occurred to us that it would be in the interest of public utility and economy that the proposed underground system should be controlled by the Metropolitan or the Metropolitan by the underground company, and that only a single line of double track should be built underground, devoted to fast trains only and that transfers should be made between the surface and the underground lines. Either one of these combinations of interests would be of direct and considerable benefit. It seems probable that by transfers between the elevated and surface lines the maximum efficiency of the two systems could be obtained and that the tendency would be towards a more uniform distribution of the passengers throughout both systems, making less congestion at particular points. At any rate, the idea is plausible enough to be worth some attention.

The Broadway road is daily becoming a still more important factor. The Columbus avenue extension has just been opened as a cable line from 53d street and Seventh avenue to 98th street and Columbus avenue, transferring passengers at 53d street to the Broadway cable cars, pending the completion of cable construction to 50th street. This connection will be completed in a few days and the cars then operated as a through line from 98th street via Broadway to South Ferry. Until the construction is com-

pleted above 98th street to 109th street, transfers will be made at 98th street and Columbus avenue to and from horse cars.

Before spring still another line will be added to the system. This is to extend from Broadway along 23d street to Lexington avenue, and through that thoroughfare to the Harlem River. The line across Morningside Park, on 116th street, which is to be operated by an underground electric conduit system, is under construction. The cars will start from Columbus avenue and 98th street, and the part of the Columbus avenue line from that point to 116th street will be provided with both the cable and electric systems in the conduit.

Lines are proposed from 125th street north to Kingsbridge and to Fort Lee ferry.

The development of these additional lines suggests still further the possibility of interchange of traffic between the surface and elevated systems by transfer tickets.

Opinions of the Pooling Bill.

The passage, by the Lower House of Congress, of the Patterson bill, amending the Interstate Commerce Law so as to permit pooling of railroad earnings, was noted in our last issue; and the newspapers have since published the views of many prominent railroad men on this event. The expressions of these gentlemen are uniformly commendatory of the action of Congress and they vary little in detail; we quote, therefore, only a few of the earlier interviews.

Mr. Horace J. Hayden, Second Vice-President of the New York Central, said: "If the bill becomes a law, I think it will have the effect of improving the conditions that govern traffic. It will, of course, tend to stop the evil of rate cutting and it will check the practice of giving large shippers advantages over smaller ones. I know of no reason why the railroads should not come together and form pools under the proposed law. They formed pools previous to 1887 and had no difficulty in fixing the proper proportions of traffic to which each road was entitled. The old pools which existed before the enactment of the Interstate Commerce Law, had no standing in the eyes of the law, and, therefore, their terms could not be enforced. Except for short periods, therefore, such pools, did not yield satisfactory returns to the roads. The fact that the railroads are to be legally authorized to come together and pool their business with the certainty that their agreements can be enforced is likely to have a good moral effect on all the roads. Should the pooling amendment be passed by the Senate, and the railroads generally take advantage of its provisions and form pools, I think the railroads would be benefited. It is not likely that there would be any advance in rates above what are now recognized as standard. Those standard rates would be maintained and the roads would consequently receive larger returns. I do not believe that business is ever stimulated much by the cutting of rates. Departures from the standard rate result, for the most part, only in discriminations in favor of certain shippers. There is just about as much business to be done with rates maintained as there is when rates are cut. With rates upheld, the lines that do the business will be more adequately compensated for their work."

Mr. E. B. Thomas, President of the Erie, said: "I do not think pooling is going to be a cure for all our evils by any means. It is a step, however, in the right direction, and agreements will no doubt be formulated leading to better maintenance of rates and better earnings. There must be, however, improvement in our traffic methods before pooling can be made effective. These methods are about as they have been for the last 25 years. We have improved the physical and mechanical condition of our railroads to a wonderful extent, so much so that we are able to move freight and passengers at a lower cost than any other country in the world, but our traffic methods are relics of the dark ages. No railroad controls the rates over its own road, and when agreements are made by all the roads by which rates can be controlled and maintained the agreements are not kept. The books of the Trunk Line Association would not hold the records of broken agreements. This condition is probably no worse among the railroads than in other vocations of life, but they attract more attention because of the magnitude of operations. What we need in connection with the pooling bill is application to the railroad business of honest commercial integrity and steadily more of it."

Mr. J. D. Layng, General Manager of the West Shore, said: "A law permitting railroads to pool their business, if construed liberally, as I think it would be, could not fail to be of benefit to the railroads. Of course, it will take some time to get the machinery in operation. At the outset there may be a little friction, but most of the roads can be brought into pool groups. Railroad men generally are favorably inclined toward the pooling plan. In my ten years' experience as a member of the Trunk Line Association I have never seen the time when everybody was so well disposed to maintain rates. There are exceptions, to be sure, but they are very few."

Mr. Stuyvesant Fish, President of the Illinois Central, said: "Such a law would operate to assure the public reasonable and stable rates of transportation, putting one shipper on more of an equality with another, and, so far as the railroads are concerned, would remove the greatest inducement to the weaker lines to demoralize rates."

Mr. O. D. Ashley, President of the Wabash road, said: "If the Patterson bill becomes a law the railroads will be able to reduce expenses by abolishing expensive agencies at the large business centers, agents for soliciting business, and by cutting off a great deal of what might be termed underground tactics. These matters have cost the railroads large amounts of money."

The Baltimore-Washington Electric Railroad.

It is nearly five years since the Baltimore-Washington Boulevard project was outlined in an address before one of the Baltimore commercial associations, and three years ago a company was formed and began operations looking to the construction of the road. In the beginning extensive real estate speculations were contemplated in connection with the railroad enterprise, and the motive of the scheme was chiefly to stimulate suburban development.

The Boulevard was to be a magnificent avenue 100 ft. wide, paved with asphalt and adorned by the art of the

landscape gardener, while the electric railroad was intended to provide easy means of transit between the two cities and the homes of a large population along the avenue. A franchise and an enabling act to secure the right of way by purchase or condemnation was obtained from the Maryland Legislature in 1893, entrance to Washington was granted last spring, and an ordinance is now pending before the Baltimore City Council granting similar privileges at that end of the line. Contracts for the construction of the Washington-Laurel division of the road, 17 miles, were to have been signed last week and the actual work of grading the roadbed will probably soon begin.

The composition of the original corporation has changed somewhat since it was first organized, the Elkins-Widener-Hambleton syndicate, which operates the several lines of the Traction Co.'s system of street railroads in Baltimore having bought stock and having assumed an active interest in the enterprise. David M. Newbold, of Baltimore, is President of the Company.

The Boulevard plan has been abandoned, and the purpose now is to build and equip an electric line of railroad between Baltimore and Washington, which shall be capable of high speed and shall enter into direct competition with the steam railroads for passenger traffic. The road will be 50 miles long, double track throughout, and the specifications call for "80-lb. steel rails on hardwood ties set in crushed-stone ballast." Twelve local stations for passengers are provided for, and the cost of building and equipping the line is estimated at \$15,000 per mile of single track or \$30,000 a mile for the double track line.

The Washington-Laurel division of the road, to be built first, leaves the city over the tracks of the Eckington and Soldiers' Home street railroad and the roads of the District of Columbia, upon which that corporation has franchises. Thence, along county turnpikes, the line will pass by the most direct route to Laurel. The course of the Baltimore-Laurel division is somewhat in doubt, owing to the failure of the City Council to pass an ordinance granting right of way along Saratoga street to the city limits. It is a question also still undecided whether the road shall go via Catonsville and tap the traffic of that flourishing suburb or proceed to Laurel by some other way. But the line in either case will follow the old Washington Road for the most part, crossing the Patapsco by a steel bridge and also the Patuxent. In addition three bridges—one of 100 ft. and two of 50 ft. each—are included in the specifications, of the Washington-Laurel division.

The overhead trolley will be used and the contract for the Washington-Laurel division calls for 3,000 poles to carry the feed wires. Power houses will be located, one in the suburbs of Washington, one in Laurel and one in Baltimore. They will be equipped with 1,000 horsepower boiler batteries, and 500-volt dynamos, and each power house will be provided with two electric units. The cost of each is put at \$60,000.

The rolling stock contracted for, with which to operate the southern division, consists of 10 motor cars, each of 100 horse-power. It is claimed that these cars will be capable of maintaining a uniform speed of 40 miles an hour, with a maximum of 60 miles. The cars will seat about 60 passengers and can carry 100.

The Relation Between Railroad Legislation and National Prosperity.*

BY DON ALEXANDER, Division Freight Agent,
C., N. O. & T. P. Ry.

III.

Let us suppose such change in public sentiment to have occurred as has led to the election of legislatures, both state and national, in which the majority is composed of men willing to do justice as between the railroad user and the railroad investor, and intelligent enough to recognize justice when it is pointed out. What shall be asked of such bodies?

In the various States, the conditions of legislation presented are as various as the States. There is probably no State in which railroad taxation is not unduly burdensome and oppressive. In many the statute books bear onerous limitations of rates, enacted either by direct legislation or through the intermediation of commissions. In others the railroads suffer under special legislation, setting aside, as against railroads only, the common law exemptions from liability under certain conditions. A volume would be insufficient to catalogue all the oppressive state railroad legislation. A hundred volumes would be insufficient to catalogue all that is offered for enactment each year.

The special object of this article is to point the way to the better safeguarding of the interests of foreign investors in American railroad securities. It is from Congress that such legislation must mainly proceed; and three enactments would accomplish it. First, the abrogation of the anti-pooling section of the Act to Regulate Commerce; second, Federal restriction of competitive railroad construction; and third, governmental supervision of railroad accounting.

Prof. Hadley of Yale, in his admirable work on "Railroad Transportation," says:

"All our education and habit of mind make us believe in competition. . . . We accept almost without reserve the theory of Ricardo, that, under open competition in a free market, the value of different goods will tend to be proportional to their cost of production. According to this idea, if the supply of a particular kind of goods is short,

*Parts I and II of this article were published in THE RAILROAD GAZETTE of Nov. 2, page 749, and Nov. 9, page 767.

and the price therefore so high as to be greatly in excess of the cost of production, outside capital will be attracted into the business until the supply is sufficiently increased to meet the wants of the market. But as soon as this point is passed, and the price begins to fall below cost of production, people will refuse to produce at a disadvantage, the supply will be lessened, and the price rise to its normal figure. If all this be true, competition, indeed, furnishes a natural regulator of prices, with which it is wickered to interfere.

"It was approximately true when Ricardo wrote; but, in the business of to-day, one point in the chain of reasoning fails, and the whole breaks down with it. It is not true that when the price falls below cost of production people always find it for their interest to refuse to produce at a disadvantage. It very often involves worse loss to stop producing than to produce below cost.

"Let us take an instance from railroad business—here made artificially simple for the sake of clearness, but in its complicated forms occurring every day. A railroad connects two places not far apart, and carriers from one to the other, say 100,000 tons of freight a month at 25 cents a ton. Of the \$25,000 thus earned, \$10,000 is paid out for the actual expenses of running the trains and loading or unloading the cars; \$5,000 for repairs and general expenses; the remaining 10,000 pays the interest on the cost of construction. Only the first of these items varies in proportion to the amount of business done; the interest is a fixed charge, and the repairs have to be made almost with equal rapidity, whether the material wears out, rusts out, or washes out. Now suppose a parallel road is built, and in order to secure some of this business offers to take it at 20 cents a ton. The old road must meet the reduction in order not to lose its business, even though the new figure does not leave it a fair profit on its investment; better a moderate profit than none at all. The new road reduces to 15 cents; so does the old road. A 15-cent rate will not pay interest unless there are new business conditions developed by it; but it will pay for repairs, which otherwise would be a dead loss. The new road makes a still further reduction to 11 cents. This will do little toward paying repairs, but that little is better than nothing. If you will take at 11 cents freight that cost you 25 cents to handle, you lose 14 cents on every ton you carry. If you refuse to take it at that rate, you lose 15 cents on every ton you do not carry. For your charges for interest and repairs run on, while the other road gets the business.

"If it be objected that such a case could not occur in actual practice, the answer is that it does occur constantly, and almost as a matter of course when the competing road is bankrupt. 'Business at any price rather than no business at all,' is the motto of such a road. It has long ceased to pay interest; it can pay for repairs by receiver's certificates; and it will take freight at almost any price that will pay for the men to load the goods and the coal to burn in the engine. And be it observed that when the competing road does not carry the war to this point, it is not a competitive rate. They may agree on a 25-cent rate, thinking that it will be a reasonable and at the same time a paying one, but such a rate is actually determined by combination, even though they take cost of service into account. Ricardo's theory was based upon the assumption that when payment fell below cost of service active competition would cease. His theory fails, because, far below the point where it pays to do your own business, it pays to steal business from another man. The influx of new capital will cease; but the fight will go on, either until the old investment and machinery are worn out, or until a pool of some sort is arranged."

Hon. Martin A. Knapp, of the Interstate Commerce Commission, has said:

"The advent of steam and electricity has not only wrought a revolution in all the methods of distribution and exchange, but is fast undermining the economic theories so long and so implicitly accepted. It is folly to shut our eyes to unmistakable facts, or to stand in the way of inevitable events. The competitive philosophy of Adam Smith may have satisfied the era of stage coaches and spinning wheels, but it will not answer the purpose or meet the requirements of this marvelous generation. . . . Some relief from its hardships and some check upon its wastefulness must surely be provided. Fools may deride and demagogues denounce, but neither protestation nor agitation nor legislation can impeach the utility or prevent the advance of industrial federation. In the vast business of public carriage, the business which unites every craft and vocation, and furnishes at once opportunity and incentive for every pursuit, some way of escape must be afforded from the rigors and reprisals of unrestricted competition."

The progress that has already been made in education of public sentiment fully justifies the expectation that the next session of Congress will repeal the anti-pooling clause of the Act to Regulate Commerce. It may almost be said that nothing can intervene to prevent such action, but a relaxation of activity on the part of the railroads themselves.

Unfortunately pooling itself is predicated on there being unnecessary lines to carry the traffic. It is greatly to be feared that the securing of revenues which will be accomplished through pooling will act as an incentive to the construction of new lines to come into the pools and claim percentages, based, not on the necessity for their construction, not on their capacity for securing and carrying traffic, but on their ability to demoralize rates and destroy revenue.

We get into the habit of considering the railroad problem as exclusively our railroad problem; forgetting that every nation that has railroads has railroad problems. European nations have had each this very problem. In some it has been met, not solved, by governmental ownership. The consensus of opinion is that the remedy is not the best. The point which demands special attention is the fact that in every European nation whose railroad mileage is considerable, governmental restriction is placed on new railroad construction. The combined railroad mileage of Germany, France, Great Britain and Ireland, Austria-Hungary, Italy and Spain in 1892 amounted to 104,687 miles, as against 174,784 in the United States. Their railroad mileage was 5.07 for each 10,000 of population; ours 26.29; yet with seven times the population per railroad mile that we have, every one of these countries restricts railroad construction. With only one-seventh the population to sustain railroads, we encourage by every device of legislation the construction

of new lines to sap the revenues of those already struggling against insolvency. Col. Aldace F. Walker says, "the question is one of the granting of unnecessary charters, which can only be controlled by action of the various States; and such action cannot be at once expected."

It is regarded, however, as extremely probable that the Federal right to regulate interstate commerce may well be extended to restricting the construction, as it now restricts the operation, of interstate lines. Such Federal legislation would, initiatorily, prevent construction of many new lines; and secondarily, be followed by State legislation of like character, following the present marked tendency toward homogeneity of Federal and State railroad legislation. The result would be the important one of giving security to the foreign investor of governmental protection against destruction of his property by black-mailing parallel construction.

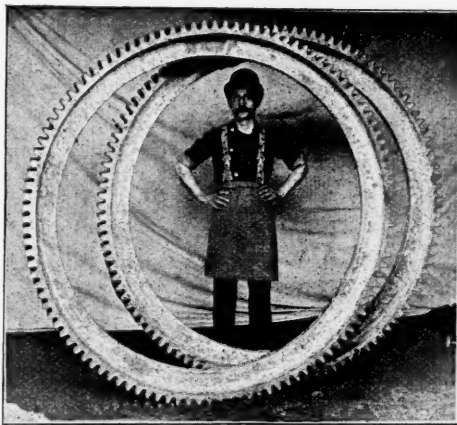
The foreign investor in American railroad securities is entitled to know how the books are kept. The necessity for exercise of this right has been strikingly illustrated within the past few months by expert examination of the accounts of a large Western system. We can scarcely imagine the disgust of foreign holders of the securities of that system when they received the examiner's report. Our present Federal law requires reports of accounts to the Interstate Commerce Commission; but it is well known that no practical benefit to investors is thereby secured; and, in fact, the data required to be reported are inadequate for determination as to the honesty with which accounts are being kept. The State of Massachusetts has done, perhaps, a trifle better; but the data required by its regulations are inadequate. It is safe to say that no two railroad companies in the country pursue precisely similar methods of accounting. It is not entirely a question of integrity of intention. Opinions may well vary as to the amounts to be debited respectively to repairs and to betterments when rail that cost \$45 per ton is replaced with rail that cost \$24 per ton and the old rail is sold for \$16 per ton.

The Government found it necessary, not for its own protection, but for that of creditors and investors, to formulate an absolutely uniform system of accounting for the national banks, and to supplement this system by special examination. There is little room for dishonest bookkeeping in banking, and very much less room for honest, but misleading variance of opinion in accounting. It would appear that there are much stronger reasons for governmental supervision over railroad accounting than over that of banks. It would be difficult to estimate the appreciation in foreign markets of American railroad securities if surrounded by the safeguard of close and direct examination and certification of railroad accounts under the supervision of the Interstate Commerce Commission.

It is seriously believed that a change of not more than 50 words in the Act to Regulate Commerce would accomplish the legislation herein indicated; would add immediately at least ten per cent. to the average value of American railroad securities; would create for them an immediate foreign demand; would be followed by the immediate importation of millions of dollars of gold to balance the exportation of securities; would solve the currency problem; and would restore the conditions of general commercial prosperity that existed prior to 1891.

Cast Steel Gear Rims.

The cast steel gear rims shown by an engraving from a photograph were made by the Sargent Co., of Chicago,



Cast Steel Gear Rims.

for Washburn & Moen for use at Waukegan, Ill. They are of crucible steel and weigh 1,200 lbs each and are said to be very accurate in pitch and diameter.

Strength of Car Axles.*

The writer, a few years ago, made some calculations of the strains upon the axles of freight cars, which seemed to be of sufficient interest to be presented to the Society. The static load on the journal of a loaded 60,000 lbs. capacity freight car is as follows:

Load	60,000 lbs.
Weight of car	27,000 lbs.
	87,000 lbs.
Deduct 8 wheels and 4 axles	6,800 lbs.
	80,200 lbs.
Load on each journal	10,000 lbs.

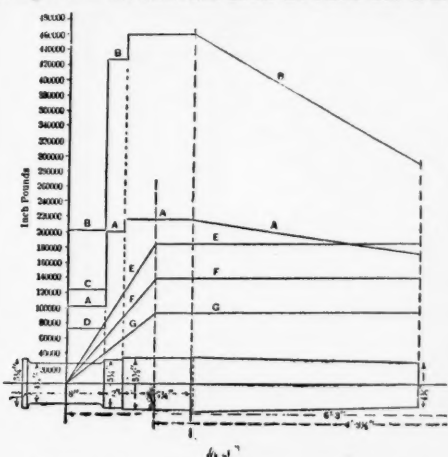
This is constant, and may be taken as the minimum static load on the journal.

This load, while acting constantly, would be of the nature of an intermittent or repeated load, the load being applied first in one direction, as regards any one set of extreme fibres, and then in the other.

The experiments of Wöhler and Spangenberg give for the ultimate strength, under these conditions, for wrought iron, 17,600 lbs., Krupp's axle steel, 30,800.

Taking the safe number of vibration at 30,000,000, we find that a 33-in. wheel under a freight car, with an average of 30 miles per day, would make about 6,720,000 revolutions, or would be worn out in about five years, if the metal was strained to the limits given.

The springs used by a number of our railroads are so arranged that the deflection under the static load is about



half the total deflection. The writer has observed a number of these springs which have been forced solid. This would give a load, when the spring was thus forced down until the coils touched, of 20,000 lbs. What the load would become when the oscillations were more than enough to force the spring solid, it would be impossible to say. The writer's observations have shown that the springs are constantly deflected to a point midway between the loaded and solid height, giving a load of 15,000 lbs. on the journal.

The centrifugal force of a freight car on a six-degree curve, at 20 miles per hour, would be about 300 lbs. for the pressure on the flange.

Scheffler gives as the results of his experiments, that the oscillations may give a horizontal component of 40 per cent. of the static load; this would give about the same figure as above, namely, 15,000, and would be much greater than that due to the centrifugal force.

We would have then the loads on the journal as follows:

Static load	10,000
Load repeatedly occurring	15,000
Load with springs solid	20,000

The movements of these applied loads would follow the lines shown on the diagram. Line A gives the moment of resistance for stress of 18,000 lbs. per square inch. Line B gives the moment of resistance for stress of 30,000 lbs. per square inch. Line C gives the moment of resistance for stress of 30,000 lbs. per square inch when the journal is worn down to the limit of $3\frac{1}{2}$ in., and line D gives the moment of resistance for stress of 18,000 lbs. per square inch under the same conditions. E, F, G, and H equal the moment of the applied forces for loads of 20,000 lbs., 15,000 lbs., and 10,000 lbs. respectively on the journal. The calculations of a large number of broken axles have indicated, though not definitely proved, that, when the moment of resistance approached the moment of the applied forces, breakages became very frequent.

The fractures in a large number of axle breakages examined by the writer have been where the wheel-seat joins the tapered portion of the axle, and were undoubtedly due to the scoring of the axle at that point by the tool. The others were about evenly divided between the center of the axles and the junction of the journal with the axle, indicating weakness at these points. It will be noticed that the lines of the moments of applied forces approach more nearly to the lines of the moments of resistance at these points.

The only cases of breakage in the tapered portion between the wheel-seat and the center of the axle which have been observed by the writer, have invariably been due to flaws in the material, and they have been very few in number.

It will be noticed that the lines of the moments of applied forces are horizontal between wheel-seats. This would indicate that the axle should be made the same diameter in the center as at the wheel-seat. The observations above, on breakage of axles, also lead to the same conclusion.

Mr. Grafstrom has shown that the action of the horizontal force due to oscillation gives the tapered form shown for the central point of the axle as about the proper one.

The question would then seem to lie between the horizontal oscillation and the vertical. Scheffler says the horizontal component may reach 40 per cent. of the vertical force. The observations of the writer are that the vertical load may be increased 100 per cent. by vertical oscillation. The writer believes, from the observations so far made, that the latter are greater, and should govern the design of the axle; but it would require a far more extensive series of observations than he has been able to make to definitely settle the matter.

The figure given for the strength of steel under repeated strain, is from Wöhler and Spangenberg's experiments, and was for steel of about 85,000 lbs. per square inch ultimate tensile strength. These figures cannot be said to represent the correct values for steel axles, although the figures for iron may be taken as correct.

There are two methods of determining the life of an axle: one by the mileage, and, consequently, by the number of revolutions made; the second by the wear of the journal. The first would give a very accurate method of determining the life of an axle. The method, by al-

*Presented at the New York meeting (December, 1894) of the American Society of Mechanical Engineers.

lowing the axle to wear down to a given limit, $3\frac{1}{2}$ in. diameter for the journal of the axle shown in the diagram, gives widely ranging figures.

When the lubrication is well done and there is little wear, the axle may be allowed to run very much longer than it should. When the journal wears rapidly, the axle is thrown out of service long before it is worn out, and while the journal may be fully strong enough to stand the load.

The Eclipse Switch Stand.

The drawings given herewith illustrate a new form of switch stand lately devised by the Eclipse Switch & Signal Co., of Beaver Falls, Pa. Its distinctive features are so clearly shown in the drawings as hardly to need explanation. The stand itself is made of a single piece of metal and the moving parts are all protected from snow and ice. As will be seen from the line drawings

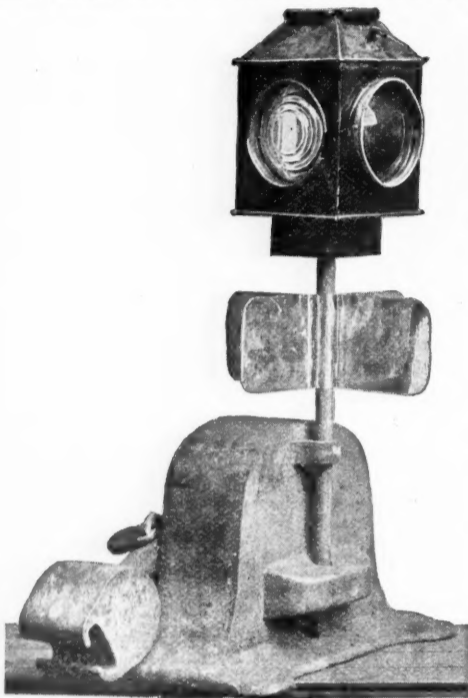


Fig. 1.—Eclipse Switch Stand.

the leverage is such that the switch is easily thrown. The vertical spindle, carrying the target and lamp, is turned by means of the bevel gear shown at G, fig. 2. The main operating lever is so adjusted that the throw from the position in which it now stands (W) to the opposite side (A) is accomplished with the least possible effort. The weight stands so high that it is easy to keep it free from mud. The total height of the casting is only 13 in. from the sleeper.

Annual Report of Interstate Commerce Commission.

The principal features of the eighth annual report of the Interstate Commerce Commission were given in the *Railroad Gazette* of Dec. 14. Since then the full text of the report proper (exclusive of appendices) has come to hand and we note additional points.

Under the head of Court Decisions the report says:

Whether a State court can take cognizance of suits brought to recover for extortionate or discriminating charges for the carriage of interstate commerce is a question of much consequence to shippers and in regard to which the decisions are conflicting. Cases of this nature relate, of course, to the contract relations of the parties in the State where the controversy arises, and are not brought to regulate the charges of interstate carriers. Upon removal from the State to Federal courts of proceedings of this character the contention has taken on an additional phase, namely, that not only have the State courts no jurisdiction of the legality of interstate carrying charges contracted for with carriers or collected by them from shippers, but that, outside of the act to regulate commerce, there is no common or statute law applicable to such cases in any court, State or Federal. In the case of *Swift, vs. Philadelphia & Reading Railroad Co.*, et al., Judge Grosscup held that "the United States as a distinct sovereignty imposes no laws upon its subjects except such as are expressly or impliedly enacted by Congress;" in other words, that there is no Federal common law, and that the common law rule of the several States which requires common carriers to charge only what is reasonable and just does not apply to carriers of interstate commerce, the only restrictions upon the latter being such as are contained in the act to regulate commerce and its amendments. Judge Shiras, of the Iowa Federal bench, states directly opposite views in the case of *Murray vs. Chicago & Northwestern Railway Co.* He holds that there is a common law of the United States as well as a law of equity and a law maritime. As above stated, these questions are full of interest to shippers, because it is important for them to know whether they can attack contracts or bring damage suits growing out of interstate carriage in their State courts, and also whether, as matter of fact, the act to regulate commerce constitutes the only legal restraint upon carriers engaged in traffic between the States.

The distinction between the Counselman and Brimson cases is not generally understood. They both relate to the compulsory giving of testimony, but here the similarity ceases. The Counselman case did not arise under the act to regulate commerce. That proceeding involved section 860 of the Revised Statutes and the fifth amendment of the Constitution. The Brimson case related to the constitutionality of the twelfth section of the act to regulate commerce. The Counselman case referred solely to a matter of personal privilege under the Constitution,

while the question in the Brimson case was whether under the Constitution a provision in a law passed by Congress was valid. Concisely, the difference between the two cases is this: Under the Brimson decision it is a constitutional exercise of judicial power for a court to compel a witness to give proper testimony before this Commission. In the Counselman decision it is held that a witness can not be compelled to give testimony before any tribunal, civil or criminal, which may tend to incriminate himself, unless he is protected by statutory enactment from the legal consequences of his testimony, and that section 860 of the Revised Statutes did not afford such protection. The decision of Judge Grosscup in the James case goes beyond this and holds that the amendment of 1893 does not secure the immunity guaranteed by the Constitution, and that no statute can.

In the argument for the establishment of uniform classification of freight by the Commission it is said that something more than unification of the present classifications is necessary. The consolidation alone would be highly valuable, but many of the rules and regulations ought to be simplified. These rules, referring to mixed carloads, to the form, size and kind of packages used and other things, are often the subject of controversy before the Commission. It is believed that merely to unify the number of classes which now varies in different classifications would be a great help. For instance, the official classification applies from Eastern points to Chicago, and also the Mississippi River. The Western classification is in force from Chicago, as well as from the Mississippi. A large manufacturer at Chicago, for instance, shipping west in competition with Eastern makers of the same article, pays the Western classification second class rate to the Mississippi River and beyond, while the Eastern dealer is charged the lower fourth class rating under the official classification on shipments to the Mississippi River. This results in a serious discrimination against the Chicago dealer which uniformity in classification would remove. The Commission would expect to properly modify the classification whenever the necessity existed and confer with sectional and general classification committees. The Commission would be glad to avoid the duty of making a classification, but railroad men as well as others believe it is needed, and yet the difficulties are so great that no other body than a governmental authority is likely ever to accomplish uniformity. It is held that compulsory legislation is almost universally demanded, and "the selfish opposition of a few carriers" ought not to defeat it.

In speaking of the necessity of prompt reports from the railroads it is said that the annual statistical reports of the Commission have become standard guides for investments and commercial interests generally. In the argument for a law bringing express companies under the Interstate Commerce act it is said that some railroad companies are withdrawing from affording favorable facilities for the shipment of some kinds of quick freight, thus increasing the large volume of express business.

In the paragraph on the abuses connected with the dilatoriness of railroads in the adjustment of overcharges, which is a strong presentation of previous arguments published by the Commission, an extract is given from a letter of a shipper in the West who has \$2,400 tied up in railroad companies' hands, this being the amount of delayed claims, which they generally hold from four months to a year. Meantime, the shipper has to pay a bank 10 per cent. interest for money with which to do business. "If the delivering carrier were subject to a specific law requiring summary settlement of overcharges these errors would be so greatly diminished as to allay much of the irritation now manifested by the public toward the railroads."

Among the advances in freight rates mentioned in the report are those from Chicago to the Missouri River, made July 1, from 75 cents to 80 cents (first class). Rates from the Mississippi to the Missouri were raised from 55 cents to 60. These are higher than any in force since 1887. The new rates have already been complained of before the Commission. The increase on hogs and hog products from the Missouri River to Chicago July 1 was from 22 cents to 23½ cents, an important advance. To St. Louis the percentage of increase was higher. On June 20 rates from Chicago to Colorado points were advanced

other localities are, for carriers' reasons, denied through joint rating on some important kinds of goods while it is freely afforded on other articles between the same points. The absence of a remedy entails upon trade and carrying interests yearly damage to the amount of many millions of dollars. The fact that needed through rating facilities can be denied with impunity in a single instance would be sufficient reason for Congressional action, so large is the amount of current railway business; and when the entire traffic conducted over nearly half the world's railway mileage is subject to such denial of continuous transportation at through joint rates without any effective legal remedy, the necessity for an amendment of the regulating statute in this respect becomes imperative.

In the paragraph on "Government Ownership of Railroads" it is said that "experience has not yet shown and no satisfactory reasons have been advanced why legislative and administrative regulation can not bring about all needed reforms in railway management. No one has ever attacked the fundamental principles of the national law. It is based on the just idea of reasonable rates and equality of treatment in the broadest sense. The statutory machinery, if we may so term it, to secure these results, has been found inadequate in some measure, but this may be accounted for by the fact that the law is of recent origin and to a certain extent tentative. The time for discussion of amendments has been short. Other questions have absorbed the attention of Congress and the country. Legislators have hardly yet come to realize that this matter exceeds all others of public nature in its importance to commercial interests and general prosperity. It is a source of encouragement, however, that discussion in and out of Congress during the past year has taken on a breadth of view and an intelligence and vigor that give promise of early and advantageous results. It is to be remembered that a statute like this, covering a new field of legislation, is generally and naturally the result of a compromise between different and conflicting theories, and that debatable questions as to the intent and interpretation of various provisions must inevitably arise, to be settled by the decisions of the courts or by amendatory enactments. It is necessary in this matter not only to discover a remedy for existing evils, but to find one that will avoid other evils of still more dangerous character."

Some details of casualties on railroads not given in the preliminary summary are shown in the following:

Of the total number of deaths to employees on account of railway accidents, 473 were due to coupling and uncoupling cars, 644 to falling from trains and engines, 73 to overhead obstructions, 247 to collisions, and 153 to derailments, the remainder being due to causes not so clearly defined. An assignment of casualties to the opportunity offered for accidents shows 1 employee to have been killed for every 320 men employed, and 1 to have been injured for every 28 men employed. The most dangerous service is that of trainmen, and for these the statistics show one employee to have been killed for every 115 trainmen, and 1 employee to have been injured for every 10 engaged in this service. A similar comparison shows 1 passenger to have been killed for each 1,985, 153 passengers carried, or for each 47,588,966 passenger miles accomplished, and 1 passenger injured for each 183,822 passengers carried, or for each 4,406,659 passenger miles accomplished. An assignment of accident statistics to the territorial groups shows great diversity in the relative safety of travel and railway employment in the various sections of the country.

Papers Read Before the Meeting of the American Society of Mechanical Engineers.

We give below abstracts of a number of the papers which were read at the meeting of Dec. 3, 4 and 5 in New York of the American Society of Mechanical Engineers.

NOTES ON STEEL FORGINGS.

Mr. G. M. Sinclair, of Philadelphia, presented a short paper under this heading. He treats steel forgings from the mechanical side only. The first point to be considered is the design. In iron forgings which are built up

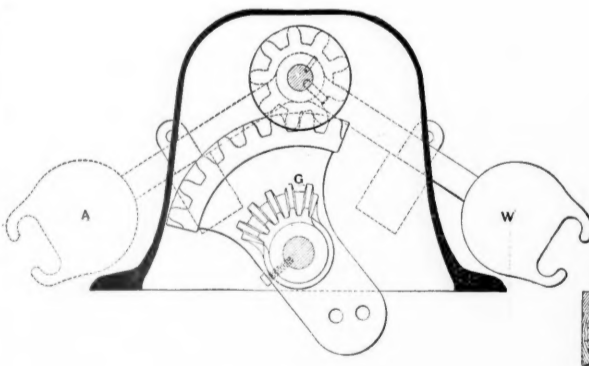


Fig. 2.—Sectional View.

Eclipse Switch Stand.

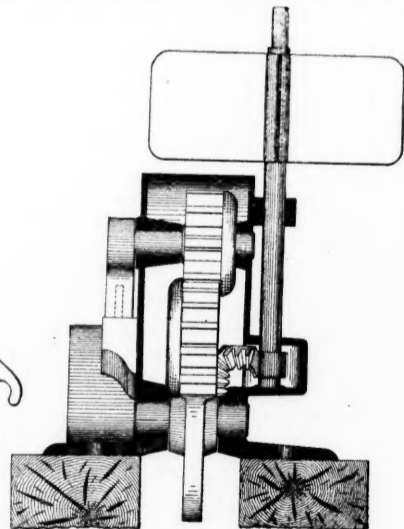


Fig. 3.—Cross Elevation.

from \$2 to \$2.32 (first class). The grain rate from Chicago to New York, normally 25 cents, remained at 20 cents from Feb. 27 to Nov. 12, a period seldom equalled in duration.

In the argument for a law giving the Commission power to establish joint rates where the railroads refuse to do so, it is said that: "The absence of any provision in the statute by which the joint route and rate can be required renders regulation halting and defective, deprives many carriers of a legitimate share of through traffic which would be created by reasonable through routes and rates, subjects trade and commerce to unnecessary restraints, and confines much of the business of numerous towns to their immediate localities. Whole sections of the country pay on some traffic the sum of rates to and from certain drivers arbitrarily used as dividing lines; places reached by a single road are often deprived of through rating facilities as to all classes of traffic, while junction points in their vicinity receive the benefit of joint tariff rates;

great irregularities of shape are of small moment in manufacture, but in steel forgings made from an ingot which must be sufficiently large to make the largest dimension of the forging more simplicity of design is necessary. The forging can seldom be enlarged beyond the greatest dimension of the ingot and welding is highly objectionable; consequently, the designer should avoid large collars, arms, sharp set downs and other irregularities; then he will get a forging that can be finished in a few heats at low cost, accurate and leaving a minimum of work for the machine shop.

The ingot is sure to have internal stresses, varying in degree with its size, and the changes of temperature in heating and cooling should be made slowly to avoid internal cracks. Heating slowly and economically required

careful design of the furnace. Some furnaces will heat 10 lbs. or more per one lb. of fuel, others use pound per pound. The ideal way of heating would be to heat from the inside outward, but this is practicable only for hollow forgings. Perhaps some time electricity may be applied to heat solid ingots in this way.

It is in the forging press itself that the most obvious field of economy is found. The change of form involves a flowing of the particles and for this kind is an essential factor. Hence has arisen the conflict between the hammer and the press. In the press the blow is retarding and its effect extended over a greater time. Theoretically, this gives the particles ample time to flow; practically, the hammer properly proportioned likewise gives ample time. In other words, the press takes longer time than is necessary. The point is that the hammer proportioned in weight to the work it must be gaining in weight what is saved in height of fall and thus delivering the blow at comparatively low velocity. The use of top steam does not forbid low velocities in the hammer, but gives a greater range and increases the product for a greater number of blows can be given in the same time; that is the height of fall need not be so great. The chief advantage of the press is, that in plain work the best designed presses are quicker than hammers, running expenses less, the shocks less and the forgings can be turned out with greater precision. The severest criticism against the press is the comparatively high heat at which the forgings are finished, but as all forgings should be annealed this criticism has little force.

Besides annealing the most generally useful treatment is oil tempering which changes the crystalline structure to a more homogenous quality and raises the elastic limit with a moderate gain in tensile strength and slight loss in ductility. Oil tempering opens the way for one bad practice; that is, the selection of a very soft steel for the forging and tempering up to fill the specifications. Oil tempering benefits the metal but leaves considerable internal stress which should be relieved by annealing and a sufficiently high grade of steel should be selected at the outset to permit a thorough annealing.

THE COUNTERBALANCING OF LOCOMOTIVES.

Mr. D. L. Barnes and Professor Goss, of Purdue University, contribute to the study of the phenomena and effects due to defective counterbalance. Mr. Barnes' paper is entitled "Rail Pressures of Locomotive Driving Wheels," and covers a good deal of ground in a very thorough way; the paper being 56 pages long. An appendix is a rigorous and elegant analysis of the path of the center of gravity of a driving wheel made especially for Mr. Barnes by Professor J. Burkitt Webb, of the Stevens Institute. Mr. Goss' paper is on the observations made at Purdue on the Schenectady locomotive that was run in the laboratory there. The experiments and observations which he recounts the already rather familiar to our readers. We shall not attempt any abstract of these papers but content ourselves for the present with giving the conclusions of the authors.

Effect of Counterbalancing on Tire Wear.

The effect of the "excess balance" on tire wear must be considerable when the revolutions per minute are as great as they are with large drivers at very high speeds and small drivers at moderate speeds. It has been shown both mathematically and by the results of the practical experiments at Purdue, that with drivers of ordinary diameter the tires are off the track for a considerable portion of a revolution at 60 miles an hour, when the "excess balance" is about the ordinary amount. Omitting the wear of brake shoes, which ordinarily do not wear the tire where it bears upon the rail, it is evident that if the average locomotive should be continuously run at 70 miles an hour there would be one point on the tires, except the main tire, that would never touch the rail and would therefore never be worn. The main wheels do not lift as much as the back wheels, that is when running ahead, for the reason that the obliquity of the main rods causes downward pressure on the track, which counteracts somewhat the lifting tendency.

In looking for the causes of flat spots on driving tires of fast-moving locomotives, the first point of importance is to find the part of the revolution where there is the least wear. This point will generally be found following the crank, that is at a point where the tire touches the rail when the crank has passed the 90 deg. point or lower quarter, the engine running ahead, that being the place where the driving wheel will probably most frequently have the maximum lift. An examination of worn tires of high-speed locomotives shows this to be the case. There are causes of tire wear other than the abrasion due to rolling contact, the principal cause being the slipping of the tires in starting up a heavy train. The "imperceptible slip" which has been said to exist has never been proved to take place after the engine has reached an ordinary speed, say of 10 miles an hour, but it occurs some times at slow speeds when the engineer is quite expert in handling the throttle. It can be seen when a heavy train is being started and the locomotive is moving at less than five miles an hour. It is due to the non-uniformity of the moment of rotation produced by the steam pressure on the pistons. The maximum moment when the slipping occurs is slightly greater than the adhesion of the drivers, and for a few degrees of revolution the drivers slip slightly. However, locomotives are not generally run in this way, for the reason that when the balance between the moment of rotation and the moment of adhesion is so delicate, the change in the coefficient of friction, caused by a slippery place on the rail, permits the engine to slip violently. For various reasons, engineers are required to avoid this. Instructions are generally given to slip the drivers as little as possible. The writer made experiments in 1891 on a heavy grade 17 miles long, of about 117 ft. per mile, on the Baltimore & Ohio Railroad (see *Railroad Gazette* Nov. 27, 1891, page 832), to determine whether, under the extreme conditions of hauling a heavy load, there was any slip after starting. The results showed that the drivers made the same number of revolutions when going up hill with a heavy train as when coming down without load.

Tires wear both by pulverization of the steel due to rolling contact and by abrasion, and, as the points of

maximum wear of each kind do not always coincide, it is difficult to predict where the most worn places will occur, unless all the conditions of speed and service are accurately known. The maximum rail pressures occur with greater uniformity for back drivers than for main drivers, for the reason that the vertical component of the piston pressure due to the angularity of the connecting rod varies with different cut-offs and modifies greatly the points of maximum rail pressures. It is only in cases where locomotives are run quite uniformly in speed and piston pressure that it is of any practical use to examine the relation of the positions of points of maximum rail pressure and the points of maximum wear.

Mr. Barnes' Conclusions.

(a) The present method of counterbalancing locomotives by providing in each driver a balance sufficient to fully counterbalance all the revolving parts and an additional balance, known as the "excess balance," which has a centrifugal force equal to about two-thirds of the maximum inertia of the reciprocating parts, is practically perfect so far as the locomotive itself is concerned.

(b) The "excess balance" now generally used for the reciprocating parts and counteracting about two-thirds of the maximum inertia of those parts, is too great for speeds above 65 miles an hour, with drivers less than six feet in diameter, as the track is liable to be damaged by the excessive rail pressure that it causes.

(c) The only practical way in which the "excess balance" can be reduced is by reducing the weight of the reciprocating parts, and as these parts are generally made heavier than the service demands it is possible to reduce the "excess balance" to a point where the rail pressures will not be destructive, provided that the diameter of the drivers be made suitable for the speed.

(d) The larger the driver for the same speed and weight of reciprocating parts, the less will be the maximum rail pressure caused by the "excess balance."

(e) The heavier the locomotive, the greater is the amount in pounds of the reciprocating parts that can remain unbalanced without causing the locomotive to shake, in "hosing" and "plunging" more than can be permitted. It is not the percentage of the total weight of the reciprocating parts that should be considered in selecting the "excess balance;" it is the actual weight in pounds that can remain unbalanced without shaking the engine too much. If one-third of the weight of reciprocating parts weighing 600 lbs. can remain unbalanced, then, if those parts be reduced to weigh but 400 lbs., one-half can remain unbalanced, and "excess balance" will be needed for but 200 lbs. instead of 400 lbs. of reciprocating weight.

(f) The maximum rail pressure of a driving wheel is not at all indicated by the static load of the wheel on the rail. The impressed load due to the "excess balance" is often double the static load, and the pressure at the point of impact when the wheel lifts from the rail and drops is even greater. There appears to be no way of determining what the impact pressure is, but the impressed load due to the "excess balance" can be calculated by the formula for centrifugal force. About all that is known about the impact pressure is that it is enough at times to bend a 70-lb. rail downward vertically one inch in cases where the engine has small wheels and is run too fast, or has the rods taken off and is run at moderately high speeds or has improper counterbalances.

(g) The speed at which any given driver will begin to lift from the rail is probably less than that at which the centrifugal force of the counterbalance equals the pressure of the wheel upon the rail, as at speeds lower than that the wheel has small vertical oscillations that may carry it off the rail. But the lift will not be important until the speed has increased to a point where the centrifugal force of the "excess balance" is somewhat greater than the pressure of the wheel on the rail.

(h) The exact height of lift of a wheel in any given case is dependent upon so many unknown and variable quantities in practice, such as the flexibility of the track and the rhythm with which points of equal flexibility succeed each other in the direction in which the locomotive is running, that it is impossible to predict what it will be. But it is sufficient to know that for the good of the track, and to prevent broken and bent rails, and for the safety of a train following a locomotive it is not prudent to run a driving wheel at a speed where the centrifugal force of the "excess balance" exceeds the pressure of the wheel upon the rail.

(i) All driving wheels for fast locomotives should be as large in diameter as it is possible to make them and not decrease the power too much in starting trains.

(k) The path of the center of gravity of a wheel, with respect to the engine during a revolution, is an oval figure with the long axis more nearly vertical than horizontal, the inclination of the axis varying constantly, owing to the difference in the elasticity of the track at different points, and to other causes.

(l) The heavier the driving wheel and the parts under the driving springs, and the stiffer the driving springs, the less will be the lift from the rail, all other conditions being equal.

Prof. Goss' Conclusions.

The results of the experiments appear to justify the following conclusions:

(1) Wheels balanced according to usual rules (which require all revolving parts, and from 40 per cent. to 80 per cent. of all reciprocating parts, to be balanced, the counterbalance for the reciprocating parts to be distributed equally among the several wheels connected) are not likely to leave the track through the action of the counterbalance, and cannot do so unless the speed is excessive.

(2) A wheel which, when at rest, presses upon the rail with a force of 14,000 lbs., and which carries a counterbalance 400 lbs. in excess of that required for its revolving parts alone, may be expected to leave the track through the action of the counterbalance whenever its speed exceeds 310 revolutions per minute.

(3) When a wheel is lifted, through the action of its counterbalance, its rise is comparatively slow and its descent rapid. The maximum lift occurs after the counterbalance has passed its highest point.

(4) The rocking of the engine on its springs may assist or oppose the action of the counterbalance in lifting the wheel. It therefore constitutes serious obstacles in the way of any study of the precise movement of the wheel.

(5) The contact of the moving wheel with the track is not continuous, even for those portions of the revolution where the pressure is greatest, but is a rapid succession of impacts.

PRESENT AND PROSPECTIVE DEVELOPMENT OF ELECTRIC TRAMWAYS.

In this paper Mr. C. J. Field reviews the first introduction of the trolley system seven years ago and its steady progress since that time. One of the difficulties met with

in the introduction of the cable and electric road was the condition of the old horse road construction. The first step was the introduction of girder and T rails, which at first were three to five inches in depth, requiring the placing of the rails on a cast or wrought iron chair or stringer in order to get the depth over ties. This method proved little better than the old flat rail, especially at the joints. The rail mills then undertook the rolling of heavier and deeper girder and T rails, which, at present state of development, gives us, we believe, a roadbed construction equal to any steam road in the country. The standard to-day for electric tramway roadbed is 70 to 80-lb. T rail, or 70 to 98-lb. girder rail, the depth running from 7 to 9 in.

The special work on track work, such as cross-overs, turnouts, curves, etc., has also met with large improvement. Now we have as a standard for this special work the steel rails bent to the form required, and surrounded by a mass of cast metal to hold them together, and one company is turning out this special work with the parts welded together; also in cast steel. The electric welding of rails at the joints when laid is then mentioned. After one winter's test of a road built on this system, six per cent. of the joints pulled apart.

Underground conduits, or the placing of the trolley wire with all its feeders under the surface of the street, is the ultimate and desirable result to be obtained in our large city lines of electric traction. Underground conduits were attempted four or five years ago, but on account of insufficient experience, lack of engineering ability, or amount of money expended on the work, as well as a desire on the part of the company installing them to make them a failure, they were not in general successful. The first really successful underground conduit to be installed and operated was in Buda-Pesth, about seven or eight miles in length, and it is now being extended to 30 miles or more. Similar systems on a smaller scale are in operation in Chicago and Washington. The conduit to be most used will be one similar to a cable conduit, with the trolley conductors placed at the sides in the shape of a channel or angle-bar or rod of iron or copper, which will be divided into sections and fed by underground feeders laid along the line of the road. Shoes or brushes will convey the current from the trolley wire to the motors on the car. Such a conduit will only be successful where it is made a double-trolley conduit and not depending on the track for the return circuit. The cost of a well-built trolley conduit in the form of a cable duct will, in most cases, exceed that of a cable duct on straight track, but less on curves.

The general basis of calculation of the horse-power required for a tramway system must take into consideration the local conditions of service, grades, curves, etc., but, in general, 15 to 25 horse-power per car in use on the road is the general limit of a well-designed station, which will include the conditions for continuous service and operation of the plant. A road of 100 cars would therefore require about 2,000 horse-power, which horse-power should be divided into, say, four units of 500 horse-power each. The number of units in any station should be the fewest number which will give a safe and economical division of the units, and in a station of this kind four or five units, according to the service and conditions, should be the standard.

The old horse-car road in large cities operated at a total cost of from 18 to 25 cents per car mile. One car mile is taken as the standard for operating expenses in our tramway service. The heaviest item in this operating expense was the question of power and this is where the electric road has made its heaviest gains in the reduction of operating expenses. This item is reduced in power service to-day to a cost, under general conditions, ranging from 1 to 1½ cents per car mile. The relative proportion of operating expenses to earnings in the horse service was from 70 to 80 per cent. operating expenses to gross earnings. In electric service we have a considerable increase in our gross earnings over our old horse line, which increase runs from 25 to 50 and even 100 per cent. in some cases, and the operating expenses being 40 to 60 per cent. of the gross earnings. In this operating expense we include all the operating expenses of the road other than the fixed charges.

The cost of building and equipping an electric road is considerable. The standard price four years ago for an equipment of two 15-horse-power motors and the installation of them was \$3,000 to \$3,500. The price to-day for two 25-horse-power motors, which are much superior to the former ones, is under \$1,000. This gives us a total cost of a motor car, including car body, truck, motors, etc., of approximately \$2,200. A single mile of roadbed construction, with 90-lb. girder rail, exclusive of any new pavement, but including taking up of the old track and replacing of old pavement, about \$7,500 per mile of single track. This makes no allowance for special work. Overhead-line construction for one mile of double track, with iron poles, feeders, etc., \$4,000 to \$5,000 per mile; with wooden poles, about \$3,000 or \$4,000 per mile. Steam and electric plant for direct-connected vertical compound condensing plant—for steam plant, \$50 to \$55 per horse-power, and the electrical, \$20 to \$25 per horse-power, making a total for steam and electric plant, \$70 to \$80 per horse-power. As a general summary, we have for the total cost of the equipment of the electric tram-road—that is, the rebuilding of an old horse road—including power plant complete, buildings, car house, cars, equipment, track and overhead construction, \$20,000 to \$25,000 per mile of single track, according to the varying conditions and requirements of different cases.



ESTABLISHED IN APRIL 1856.
Published Every Friday.
At 42 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contract for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Mention has been made in these columns of a serious landslide on the shore of Puget Sound at Tacoma, Wash., on Nov. 28. Extensive grounds on which were wharves and buildings belonging to the Northern Pacific Railroad apparently slid into the water, leaving a depth of 60 ft. of water where the land had been. Some of this ground was artificial and it was assumed that the part which had been filled in became detached from the natural surface; but Chief Engineer McHenry has had careful soundings made for a distance of 800 ft. from the shore and he concludes that this is one of the greatest subsidences ever known in this country and that the depression as visible from the shore is but a small part of the actual disturbance. It is believed that the center of it was at least 100 ft. below the bottom of the Sound and probably 900 ft. or more from the shore. The sinking was vertical and not, properly speaking, a slide. The weight of the made land could not have been the cause.

In our issue of Dec. 7, page 833, appeared an abstract of a paper by Mr. J. N. Barr on The Lessons of the Scrap Heap. Of this subject Mr. Don J. Whittemore once said "The scrap heap, that inarticulate witness of our blunders and the sepulchre of our blasted hopes, the best but most humiliating legacy we are forced to leave to our successors, has always to me been brimful of instruction." Some of this instruction Mr. Barr has brought to light. In endeavoring to compress his paper we edited out some of the liveliest passages, and we recommend the reader to get the whole paper as it now appears in the published proceedings of the Western Railway Club for November. It is full of suggestions which are particularly valuable to railroad men in these hard times. Perhaps it is the improvement of machinery and the heating furnaces of smith shops as much as any other factor which has rendered Mr Barr's plan a practical one. With the old methods of hand labor, common on railroads before special machinery was introduced, the cost of making over old material was too great to make it practicable. There is even some talk now of re-rolling old rails to shape up worn treads, and a patent has been issued to a general superintendent of a western road, which comprehends a plan for doing this. Some steel casting makers are offering to re-melt and re-cast broken steel couplers and one western road claims to have saved more than half a million dollars in the last three years by gathering up the old material and what is termed "obsolete material" and sending it to a central point, where it is examined and used again in some form or other. This indicates a tendency toward the sort of economies that are practiced in older countries, Germany for instance, where the study of the possibilities of small saving is one of the most important duties of the highest officers of the railroads.

The Bethlehem Iron Company has secured a contract for armor plate for two Russian battle ships, the Sebastopol and the Petropalovsk. The quantity is 1,200 tons. The contract was taken over fourteen competitors, including Krupp and manufacturers from England,

France, Germany and Italy. There can be no doubt, we suppose, that we have in this country the most efficient armor making plants in the world, and make the best armor; and considering the enormous percentage which the cost of manufacture bears to the total cost of armor plate, this is pre-eminently an industry in which the man with the best machinery and the best methods can win. This fact has been so apparent that the Bethlehem Company has made previous efforts to invade the foreign markets. We believe it to be true that the company had a very good chance to get a large order from Japan which was ruined by the deplorable facts which were made public as to skinning in United States armor contracts at Homestead. Of course, this should not have affected the credit of the Bethlehem Iron Company abroad, but doubtless it did, for, as we pointed out at the time, it would be regarded among foreigners as evidence of the danger of dealing with American manufacturers. There can be no doubt, we believe, that this Russian contract will be carried out in such a way as to help the standing of Americans in foreign markets.

The November reports of railroad gross earnings show a little improvement—not great, but still an improvement; that is, the loss in November, as compared with the year before, was 1.58 per cent.; in October it was 5.59, and in September it was 6.22. It is said that we should expect a change for the better in November, as the World's Fair travel had ceased. Doubtless, however, the World's Fair travel continued until far into November, very likely till the end, or even later, for a great many people would be moving, long after the Fair closed, on the unused portions of excursion tickets. In 1876 the Centennial closed November 10, but the travel that year swelled railroad earnings until the end of the year. On the Pennsylvania Railroad, which of course was far more affected than any other system, the increase in passenger travel in the month of December was 51 per cent.; in November it was 109 per cent., and in October, which was the heaviest month of that year, the increase was 132 per cent. In fact the gain in November and December earnings was nearly as great as for the first four months of the Fair. So our comparisons this year are, no doubt, still affected rather seriously by the World's Fair travel; yet there are other reasons still operating to cut down gross earnings. The *Chronicle* reports the receipts of grain of all sorts at the western primary markets in the five weeks ending December 1, as about 44 million bushels against 58½ million last year. In Chicago the falling off was still greater, having been this year 11½ million bushels against about 19¼ in each of the three years preceding. The movement of provisions and live stock was larger than a year ago and helped somewhat. Southern roads show a small increase and the southwestern roads show a decrease of only a little over \$100,000 for the month. These roads have been helped by the great cotton movement.

The Boston shoe dealers have grumbled so unanimously that the Trunk Lines have concluded not to demand that all cases of shoes be strapped with iron as a condition of being carried at first class rates. The tendency to make cases out of ¼ inch boards will now continue, we suppose, so that by and by pilferers can get a pair of shoes as easily as they now get watermelons. But the Trunk Lines are no sooner rid of this complaint than they have another, as bad, in New York. The new classification puts cotton piece goods up from third class (50 cents, New York to Chicago) to second (65 cents), and the shippers at once give the reporters a lot of doleful stories how western buyers will go to southern cities (whence rates are not raised) to get their awning stripes, calicoes, canton flannels, canvas, cheese cloth, corset jeans, cottonades, cotton duck, cotton warp, cotton yarn, crash, chevots, ginghams, glazed cambrics, osnaburgs, window holland and such like things. Inasmuch as the proposed increase amounts to only 60 cents on a 400 lb. case to Chicago, one might be pardoned for doubting whether Atlanta and Charleston will enjoy a very great boom on account of this oppression at New York; the manufacture of the goods named has not been carried on long enough in the South to draw trade away from New York without some more powerful lever; but even if the Trunk Lines do lose a little business by the change it is to be hoped that they will stand their ground, for it is in the interest of good business methods. This minuteness of description is absurd where the money at stake is a twentieth or a hundredth of a mill per yard, and, as the railroad men now aver, it is a constant temptation to shippers to indulge in petty cheating. While the total freight charge is such a

small burden that the consumer never feels it, still a dollar or two on a shipment is enough for rival drummers to use as a final straw to tip the scale, and so false descriptions are common. There was never any excuse for taking any kind of dry goods out of first class (even now brown sheetings and shirtings are left in third class) and it will be a good thing to get these commodities part of the way back to their proper place. They were reduced simply as a means of meeting a vociferous demand for a reduction, but it was the most unscientific means that could have been taken. Quite likely it would have been better to make a commodity rate for all dry goods. Basing rates on the color of a stripe or the "feel" of the nap on a fabric, may do for the custom house people, but it is nonsense in fixing freight rates. Every change of classification of this kind produces more inequalities than it cures.

Concerning a Recent Boiler Explosion.

A contemporary, commenting on the causes of a locomotive boiler explosion, says that it is supposed that "when the engineer opened the injector, water covered the crown sheet, which, being at a very high temperature, completely vaporized the water, thus causing the explosion of the boiler. This is the most probable version of the cause which produced the catastrophe." After the explosion it was found that the crown sheet had been hot. Just how the complete vaporization of the water in the boiler can cause an explosion is not explained. Most people think that a boiler has its principal function in vaporizing water completely into steam, if not, then what is the boiler for? It was probably intended to say that the water was suddenly made into steam and caused the explosion, as that is an old theory still held by some, although long since proved to be fallacious. Not long since a lawyer for a railroad company in a western state, held forth to the jury somewhat as follows: "It has seldom been my pleasure to see such a row of intelligent faces in a jury box and this gives me courage, as we shall show to any intellectual mind, that the fireman, in this case, was careless, and not the victim of the parsimony of the railroad that has permitted large cracks to exist in the sheets. We shall show that this fireman let the water get below the crown sheet, which became red-hot, in fact, I may say, white-hot, and then opened the injectors and threw cold water on that hot crown sheet and a mysterious gas was generated which instantly ignited and caused the catastrophe by which he lost his life." The jury decided that the large cracks, extending between several stay-bolts, horizontally, and which had been closed temporarily by a cold chisel were the more probable cause and the widow got a verdict.

The United States Government settled long ago by extensive experiments that cold water on hot sheets would not, of itself, produce an explosion. A calculation shows that even a red-hot sheet will evaporate but very little water and not enough to produce any great increase in pressure. Railroad officers are too much accustomed to the wild theories of locomotive engineers and firemen, that have been and are still advanced to serve as excuses for crown sheet failures and boiler explosions, to take stock in the mysterious gas or complete vaporization theories. In most cases the cause of crown sheet failures is carelessness on the part of the engineer and fireman. The crown sheet gets hot because of low water and, becoming weakened and plastic, it blows down and there is no way of holding it up when heated, so far as is now known. A well-known English engineering paper has been led in to a similar error recently, although the causes of the violence of steam boiler explosions have been well explained, both theoretically and by experiment.

The reason for the shattering of plates and dynamite-like force exhibited in a steam boiler explosion, is easy to understand. The water is heated to the temperature of the steam and when the pressure is lowered, by a rupture of the shell, part of the water explodes into steam instantly, or nearly so, and the remaining water is thrown about with great force. The combined effects of the sudden expansion of the water and the shock of the water when thrown against the sheets, tears them in about the same way that they would be torn and fractured if dynamite were used. When a boiler is burst by over pressure with cold water there is no explosion. When an air tank explodes by over pressure of air, the explosion does not take place with the violence that is characteristic of the explosion of steam boilers, and it is believed that if steam alone was in a boiler, the explosion would not be any more violent than with air pressure, and probably it would be less violent, as some

of the steam would condense as it expanded, which is not the case with air. No boiler explosion has been shown to be more violent than experiment and calculation have indicated would be the probable result in case of a sudden reduction of pressure due either to a rupture or the sudden opening of a large aperture. In experiments, boilers have been exploded by the sudden opening of a very large valve, and perfectly sound boilers have been blown into fragments by the sudden failure of a large man-hole plate. It is the almost instantaneous removal of pressure which permits the heated water to expand with a suddenness which produces a result that is practically an explosion similar to that of high explosives.

There is no mystery about boiler explosions and if the facts were not buried with the firemen and boiler attendants, the exact conditions which led up to the first ruptures, and which act like the trigger of a gun to give the final explosion, would be known and the whole subject would be better understood, and appreciated by practical men.

The Traffic Managers' Doings in 1894.

The traffic departments of the railroads have accomplished nothing startling during the past year, but it will perhaps be well, nevertheless, to recount briefly what has occurred, for possibly the future may show that 1894 has made some real history. In hard times we work hardest to get business, and in so doing put ourselves in the way of learning better methods. Probably the greater part of the energies spent in this direction has been devoted to the prosaic business of paring down expenses, for the traffic managers have done their part in this unpleasant part of the year's work, but real progress has been made in some lines. One prominent general manager has publicly stated that on his road economies have been effected that were never dreamed of before.

The excursion business has been cultivated more thoroughly and, we think, more generally than ever before. The additional cars and other facilities provided for the World's Fair traffic in 1893, have, on many roads, furnished more than usual scope for the activities of the passenger men. The science of making money by reducing passenger fares is not susceptible of clear statement within the limits of a newspaper article, and we cannot refer to any particular road that has done better at it than others, but all of the principal railroads running into Chicago carried large and frequent excursions to that city in the Fall; the usual excursions from Philadelphia, Pittsburg and Cincinnati were heavier than ever, and various other roads report that they have exceeded all their past records in this line. The brisk contest between Indianapolis and Chicago appeared to outsiders to have been carried to excess, though we are not sure whether the chief participants look at it in that way. Happily (for the officer—perhaps not for his road) the result of such a stimulation of travel by severe reductions always has large elements of uncertainty so that either party to the contest can claim to have won or to have suffered, as he may deem politic.

The traffic associations, as a whole, have probably held their own. They are ropes of sand at best. No one expects them to stand any great strain, and they have all been strained seriously during the past year. The Western Passenger has, in fact, gone to pieces, but the ruins will probably be the foundation of a new organization, so that it is by no means right to call this outcome a failure. Some organization must be maintained merely for statistics, and conferences between roads will be a necessity as long as competition is a factor in business, so that the most unsatisfactory association has its uses.

The Atchison and the Southern Pacific had a savage but brief war on transcontinental passenger rates in the Spring, and a little later there was serious cutting between Chicago and Denver. Eastbound freight rates from Chicago were "rotten" before navigation opened, and they remained on the low basis of 20 cents, Chicago to New York, throughout the season. The grain movement was light, the boats had but moderate calls in other business, and they got their full share of grain. Although the all-rail grain rates were officially reduced to the 20-cent basis, secret reductions, still lower, were indulged in much of the time.

The most hopeful thing in association work has been the clearer definition of authority, the placing of power by each road more definitely in some one officer's hands. This has been done by the roads west of Chicago, and also by the Central Traffic roads. The former took action in June, and good results are already apparent. In spite of disagreements between the roads, freight rates in that territory seem to be fairly stable. The Trunk Line Association,

stronger than those just mentioned, seems to be fulfilling its mission, as far as any such organization can under the existing laws. With no cohesive force but honor, and with ample opportunity for the weak lines to reduce rates, while still retaining their honor,—or, at least, considerable apparent self respect—the strength of rate agreements must rest on the spirit of the parties; and this spirit has seemed to improve in the past few months.

Probably it is safe to also class as hopeful the division-of-traffic conferences that have been held in Joint Committee territory and west of Chicago during the past few months. If pooling should be made legal, a good preparation would have been made, and if present conditions continue, the understanding between the competitors at the several points will have been brought to the best state that is practicable.

A notable instance of the good that may be derived from an association is to be found in the action of the Trunk Line Commissioner last spring in allowing the Erie to temporarily reduce its westbound rates on freight, the old tariff being restored as soon as the road's proportion had sufficiently increased. One sensible act of the Joint Committee which should be mentioned is the reduction of the difference between rates on goods shipped at owner's risk and shipments made at carrier's risk. This is in one sense a small matter but it embodies an important principle and the change has no doubt allayed much friction. The complaints of shippers at unjust conditions in the uniform bill of lading, while mostly well founded, were, no doubt, exaggerated; for several of the roads acceded to the demand for a bill of lading almost devoid of conditions and yet no harm seems to have resulted.

In March the Louisville & Nashville and the Queen & Crescent had a very sharp quarrel and in June freight rates from eastern seaboard cities to the South were reduced more than one-half, remaining so several weeks. The first named disturbance resulted in a severe reduction of rates which has been made familiar by the action of the Interstate Commerce Commission in attempting to regulate rates in the same territory. The Canadian Pacific has been a thorn in the side of all its competitors on this side of the line throughout the year. The whole of the competitive traffic in which that road is interested is very small, but it affords material for controversies sufficient to fill columns of the newspapers. When the Canadian Pacific is not engaged in a contest with the roads west of Chicago its attention is turned to the eastern lines. Just now it has come to an agreement with the latter; but by the time this is adjusted so that the rates will apply through to the Pacific coast, probably the brittle foundation on which peace rests will have cracked at some other point.

The railroads of Iowa asked the Commissioners of that State to permit an increase of freight rates, but the commissioners evidently intend to take about two years in which to give their answer. Nebraska's attempt at reduction of rates has failed for the present, Judge Brewer having decided that the Newberry law made too large a reduction. A similar decision was given on the Texas law, but the commissioners of that State have taken heart and are now trying to regulate rates with a gentler hand. The Kansas Commissioners issued some kind of a reduction order but it does not seem to have amounted to anything.

The United States Circuit Court of Appeals has sustained the general application of the long and short haul section of the Interstate Commerce Law. Other legal decisions affecting rates will have been seen by the reader in the annual report of the Interstate Commerce Commission, given in the *Railroad Gazette* last week and this. There is hope that the prohibition of pooling will be abolished within a month or two. If this is done the traffic departments will have numerous novel questions to consider, for a pool that is to be binding in the eye of the law will be quite a different thing from one which any petulant subordinate could repudiate whenever he felt like it.

The foregoing are the salient features of the situation as one surveys the field with a view to recording changes. Of course a large proportion of the transactions of this department of the railroads never appears on the surface and cannot be learned "for publication" until a good while afterwards. For instance, the mild demoralization of passenger rates between New York and Buffalo seems to still continue, sufficiently to afford the scalpers some bread and butter, as it has for years past. That is a matter that ought to be corrected; but it does not count as "news." Again, many roads have restored passenger trains that were taken off on account of the hard times, but the results, though presumably favorable, are not of a nature to be stated in a summary like this.

The Decision in the Debs Case.

The decision just handed down by Judge Woods of the United States Circuit Court sitting at Chicago last summer during the strike recalls the unusual interest that the public took at the time in that great social struggle. It was a contest, memorable in many respects, but in none more than in the variety of powers appealed to for protection. From the Mayor to the Governor, from the Governor to the President, from the President to the courts, the railroads successively or simultaneously appealed for help. And apparently the longest memory of all these tribunals resides in that which, while quick to start, has been the slowest to finish the relief it had to give. Hence, after a lapse of six months, when the strike had become a mere memory except to the strikers and the struck, this judicial Nemesis rises up and pronounces judgment against the departed sins of Debs and his associates, without passion, without forgetfulness, and without doubt. Justice travels, as the old saying is, with a leaden heel, but she strikes with an iron hand.

The very calmness and deliberation of this judgment make the lesson it teaches all the more impressive and beneficial. One never realizes so much the inconvenience of his peccadillos as when, long years afterward, they pursue him in his retreats of wisdom and happiness. Not only the world at large, but even his confidential medical adviser, turned against Debs because of his unfortunate leadership. But that was before the summer solstice was well nigh gone. Long since the adfly of the press even has ceased to plague the President of the American Railway Union, and he has had a good long surcease of sorrow. It must be particularly aggravating now to be brought up again, after a moral convalescence, with his renovated receptive and perceptive faculties brighter and better than ever, and have the majesty of outraged law and order rubbed into him, as it were, when he had begun to be peaceful and happy again.

But when you come to think of it, while it may be exasperating to Debs at this particular time—here at Christmas, and in this particular way, in the seclusion of a prison,—the circumstance is neither unnatural nor unexpected.

Judge Woods had solemnly warned Debs and his associates not to conspire in any way whatever to injure the person or property of other people, in exercising the right to strike, and particularly enjoined him and them by no means to molest the common carriers in the high duty of transporting the mails of the United States. Debs appears to have overlooked this matter, or in an evil hour to consider it of no special consequence anyhow. But here Debs made a great mistake. An injunction is a particularly dangerous thing to fool with, as one may soon learn by trying the experiment. A buzz saw is a mere pin wheel compared to it.

Notwithstanding the injunction, Debs went on with his meetings, which the court finds inflammatory and directly conducive to the things it had forbidden; with his bulletins and his telegrams which welded more firmly together the conspiracy it had plainly told him to abandon; with his condolences, his encouragements, his general orders and wild talk, which stimulated, if it did not excite, the unreasonable resentment against constituted authority, and paved the way to break both the letter and the spirit of the process of the court.

When it was all over, and the star of Debs went down and out for many reasons, but particularly because it never had any cause for rising at all, at least in the way and on the occasion it did, the day of reckoning with the court came. In the vernacular of our times, it was a cold day for Debs and not very clear at that.

When called to answer why he had not obeyed the injunction, his first point was the very strongest he could have made legally and the weakest morally: *that no man is obliged to criminate himself.* It began to appear that at last Debs had somebody behind him who knew a thing or two; he now had counsel.

The defense was twofold and quite as often bold. In the first place the Court had no jurisdiction to issue the injunction. The suit had been instituted by the United States as a plaintiff against Debs and his associates; and the cause of action was found in the conspiracy to obstruct the mails and interstate commerce. Judge Woods clearly showed by reference to the authorities that the obstruction was a public nuisance which every government had an inherent right to abate, and that in interfering with the trains which contained the mails, the defendants were detaining the property of the government itself. The Court finds an additional ground of jurisdiction in the Anti

Trust Act of 1890, which pronounces illegal every combination in restraint of trade or commerce. In so holding, Judge Woods disapproved of the Patterson case decided by the United States Circuit Court of Massachusetts in February, 1893, which held that the restraint of commerce forbidden by that act was a restraint by contract, and not a restraint by violence, intimidation or boycott.

When the Court held that it had jurisdiction to issue the injunction, Debs fell back on the proposition that he had not violated it.

The command of the Court was that he desist from the conspiracy. The evidence very clearly showed, and all the world knows, that Debs did not desist at all from doing what he set out to do. There was no slacking up in his efforts to accomplish what he had in his mind by the methods he had devised for the purpose. In his defense he entered very little upon exculpatory proof. He was doubtless well advised here that if he opened his mouth, he would put his foot in it; and all that he offered in his own behalf was a document or two which contained some purfunctory exhortations to the strikers to abstain from lawless acts. The Court was thus compelled to enter upon the investigation of his actions without that lucid explanation which the actor is always supposed able to give. An innocent man generally avails himself of the earliest opportunity to clear up the doubt when circumstances have a doubtful aspect or decidedly point to a crime. The presumptions, therefore, which silence produces in a case like this are unfavorable to innocence, and Mr. Debs could not complain if this unsatisfactory inference arose as to him.

Judge Woods groped along through the vast mass of evidence before him, and the conclusions deduced were that Debs and his associates had deliberately disobeyed the injunction served upon him and them.

We are not able to verify the conclusions of the Court from the facts in evidence before him. It may be that he has drawn inferences that are not warranted by the facts. If so, we suppose an appeal would correct the error. The learned judge finds evidence directly to the point that the defendants "expected and intended that this strike should differ from others only in the magnitude and boldness of execution, and that the accustomed accessories of intimidation and violence, so far at least as found essential to success, would not be omitted." The right of men to strike peaceably, and the right to advise a peaceable strike were not questioned by the Court, and so far as the injunction in the exuberance of its alternative phraseology went to the contrary, it was undoubtedly erroneous and would have been corrected either by application to the court issuing it, or upon appeal. But so far as we are informed, no such application for a modification of the process was made. And at any rate the defendants' guilt was not placed upon a technical violation of a possibly erroneous provision like this, but rather upon the ground that they were responsible morally and substantially for the lawlessness which constituted the violence of the process.

Amid the shower of press comments upon the decision, there are discernible clearly and distinctly two grounds of objection to the punishment meted out to Debs. One is that the court should not under any circumstances be allowed the prerogative of punishing the disobedience of its process. And the other is that such punishment, however proper in other cases, should never be inflicted for such disobedience when in aid of a strike. We cannot see the force of either position. The remedy of injunction is justly valued as one of the strongest and most efficacious of our judicial system. But its strength and efficacy are derived not from the fragile paper upon which it is written or the dignity of the court from which it issues, but rather from the power to enforce compliance with its mandates. And this power is largely, if not exclusively, the power to punish for contempt.

One cannot say it is a new-taught idea, and at odds with our Anglo-Saxon institutions. To the contrary, the prerogative has grown apace with our liberties and from the earliest times has served as the handmaid of equity in its work of restraining the oppression of the weak by the strong and great. As our civilization advances, the capacity to work evil in disguised and ill defined forms has expanded. The power to detect and prevent encroachment upon rights, however little those rights were known to the last century or the last generation, is still valuable. It reckons little to get a money judgment against an insolvent rioter for burning down your house. It is vastly better, when advised of his purpose, to stay his lawless act. The world of honest plain people who are responsible for our institutions have long been of this way of thinking, and we are not prepared as

yet, to counsel the contrary, because a very respectable court has found Debs and others guilty of inciting to crime and violence, and has punished them accordingly.

The Accident in the Chicago Cable Tunnel.

Last week there was a collision between two cable trains in the Washington street tunnel in Chicago. So far as can be learned the causes were insufficient braking power on the train and a broken cable grip. The result was two people killed and more than 20 injured, some very seriously. The danger of operating cars as they are operated in these tunnels, is not half appreciated, and it is doubtful if, in any other city than Chicago, such a plan would be permitted. The grades in the tunnels are steep and the only way the cars can be held, except by the cable, is by putting the brakes on all cars by means of the handle on the front or rear platform. This requires that the conductors shall be at the brakes and that the platforms shall not be so crowded but that they can turn the handles. These trains are veritable rapid transit trains with four cars which are generally loaded with about 80 passengers each during crowded hours. It is doubtful if all the handbrakes would hold enough when the cars are crowded if a train is allowed to get a little headway. This is appreciated by the railroad company to the extent that they sand the rails, and that is about all they do to insure safety. The new Van Buren street tunnel has racks and a safety brake, but the other tunnels have no safety devices whatever.

On entering the tunnel the brakes on the rear car are generally set by the conductor so as to prevent the train running up on the cable. On the intermediate cars the brakes are not set and the platforms are generally so crowded that the conductor could not reach the brake handle if he tried to. The company has two rules which conflict and could not be carried out. One is that the conductor on each car shall be at the brakes when going through the tunnel, and the other is that the conductor will be "bounced" if he misses fares. A large number of passengers get on at the entrance to the mouth of the tunnel and a goodly number get off at the other end or very soon thereafter. The entrance to the tunnel is at the end of the down-town loop and it is useless to collect fares before that point, and unless the fares are collected in the tunnel some will be missed, and this the conductors know to their sorrow, as the railroad companies' "spotters" are continually after them. One rule definitely requires that conductor must be at the brake handle, the other rule compels him to collect fares in the tunnel or lose his job.

The danger of the plan is obvious; although the brakes on the different cars are generally connected so that they can all be applied by the gripman, yet it is not possible for him to exert power enough to hold a heavy train on the grade; hence it is a fact that when these trains are heavily loaded, reliance is placed almost solely on the hold of the grip on the cable. Grips break, not seldom but frequently, and the railroad companies' inspection seems to be bad, or the construction is poor; but whatever the reason, they break, and not alone in the tunnel, but in other places, where the line is level. The brake rods, under the cars, break more frequently than the grips.

Admitting the perils of the situation, what could be done? In the first place, the trains could be spaced before entering the mouth of the tunnel with the longest possible interval compatible with the schedule. This would place the trains in the tunnel much farther apart than they now run as a minimum distance. The train starter at the mouth of the tunnel could be required to see that every conductor is at the brake before the trains enter the tunnel and to report those who are negligent. The fares of people getting off at the opposite end of the tunnel could easily be collected by a man stationed there for that purpose, or by putting special collectors on the cars through the tunnel. It is probably practicable to increase the strength of the grips; at least they can be so inspected that if they are in danger of breaking they can be removed. The brake rods under the cars are not so strained but that they can be made larger, and with such a high factor of safety that they will not break unless badly worn, and this will make the inspection easy.

A track such as is provided in the Van Buren street tunnel might be provided in the others, but it would be better to also use a powerful, compressed air automatic brake. It would cost more money to apply such a brake and more to maintain, and like most railroad safety appliances, it would require more attention. However, it gives safety, because the braking power can be made sufficient without the attention of the conductors, and it can be wholly under the control of the gripman, as it should be, as he alone of the employees on the train knows when there is danger ahead. The principal advantage of the automatic feature is that whenever the brake is defective it makes itself known by stopping the train and it is always ready for instant use. It cannot be said that there is no such brake, as some have claimed, as there are several now in operation in this country. It should be remembered that to carry four-car trains with about three hundred human souls packed into light, fragile cars, up and down steep inclines, with an interval between trains of only a few seconds, is dangerous railroading, and not ordinary street traffic, as that is generally understood. It is a misfortune to any street railroad company to have to carry its passengers under such conditions, but facts are stubborn

things, and having the conditions to meet the company must, sooner or later, recognize its responsibility and give to the public what it has a right to expect, namely, the expenditure of a reasonable part of the large profits made out of the people's nickels for the public's safety and comfort.

The elevated loop situation in Chicago still remains unsettled, the cause for the hitch in the joint agreement and in fact the joint project itself, are not yet made public, but the fact that there is a hitch is well understood. It appears now that the original plan for the loop will not be carried out and it is pretty safe to predict that the loop will be smaller, and possibly that there will be something in the nature of a stub terminal for the different lines. The Lake Street road will be in pretty fair shape by the first of the year, or as soon thereafter as the terminus is completed, as it will then be at Wabash avenue, corner of Lake street, which is about as near the heart of the city as that road needs to go. It is but a short walk from the shopping and business districts to this terminus; it will perhaps average a walk of about four blocks due north to reach the road, and most folks would walk this distance to get a quick train to a point more than 2½ miles out. It is not clear how this road would be benefited by a loop, as it crosses most of the principal business streets of the city near the heart of the business district. This road can probably earn operating expenses if the trains are put on to suit the traffic during the crowded hours and are mostly taken off at night and during the middle of the day, and this will be more possible if the motive power is changed to electricity as is contemplated. It is reported that as the engineering features of the loop, and the possibility of getting it at all, are nearly settled, the promoters have paused to consider the economic features before signing agreements.

We learn from an English exchange that a movement is on foot in that country to establish a society of consulting engineers. The editor cautiously adds that he "hopes that if this proposition comes to anything the results will be commensurate with the need which the originators have undertaken to meet. Under the circumstances it would have our very warmest support." We suspect that he will not be called upon soon to give up any latent heat in support of such a society. We venture to say that if one is formed it will not include the really representative men who are in consulting practice.

The Chicago, Milwaukee & St. Paul, as a measure of economy, has adopted the system generally in use on other roads of placing the duty of investigating small stock and fire claims along the line in the hands of the roadmasters and division superintendents. Heretofore this work has been done by special agents under direction of the claim department. The change will dispense with the services of six men and result in an annual saving of about \$12,000. The statement sent out from Milwaukee that it is proposed to abolish the office of assistant general superintendent is officially denied.

NEW PUBLICATIONS.

The Traditions and Superstitions of Engineering Construction; being an account of the Legends, Folk-lore, Rites, etc., concerning Roads, Bridges, Mines and all Manner of Engineering Work. By Paul Sébillot, of the Ministry of Public Works. Octavo, 640 pages, with 430 illustrations, 3 colored plates and 9 reproductions of Medals. Paris: J. Rothschild, 13 Rue des Saints Pères; 1894.*

This is a unique and curious compilation of the folk-lore and superstitions of all nations concerning roads, bridges, railroads and other public works and mines and mining, illustrated by many quaint engravings copied from ancient volumes and by copies of interesting medals, which have been struck in medieval and in modern times to commemorate the opening of bridges, ports, railroads, etc., for public use. The accounts given of the earliest traditions, in all countries, carry us back to that period of dark superstition when it was deemed necessary to the success of any public work that it should be consecrated by the immolation of a human victim. So universal is this tradition that it cannot be doubted that our very remote ancestors hallowed their great undertakings by the slaughter of human victims or by immuring them alive in the foundations. Later, the human sacrifice was commuted, as with Abraham and Isaac, for that of an animal, a custom persisting to this day among people so nearly civilized as the Turks. Upon the opening of the railroad from Jaffa to Jerusalem in 1892, it was sanctified in the presence of thousands, by the immolation of three sheep, the Mussulman Hodja officiating.

In the next stage of progress it was still believed necessary to place coins in the foundations in order to secure stability, and even now we place coins and documents in the corner stone with appropriate religious ceremonies.

The grotesque demonology of the Middle Ages, as affecting public works, and the beliefs entertained by the common people in regard to the part taken by the devil in their construction, occupy a great space in this vol-

*Les Travaux Publics et les Mines dans les traditions et les superstitions de tous les pays, par Paul Sébillot, ancien Chef du Cabinet, du Personnel et du Secrétariat au Ministère des Travaux publics.—Croyances, Légendes, Coutumes, Folk-Lore, Rites, etc., concernant les Routes, Ports, Chemins de fer, Digues, Canaux, Hydraulique, Forêts, Phares, Mines et Mineurs depuis les temps les plus reculés à nos jours à travers l'Europe, l'Asie et l'Afrique.

ume. According to them, the devil was the most enterprising and efficient contractor anywhere to be found. If any engineer, architect or contractor found himself in difficulty, he had only to make a compact with Satan who would perform his task, in a single night, generally; but very suddenly at any rate; the only price demanded being the possession of a soul. According to the more common legends the devil was often careless about the terms of the bargain, and at the conclusion of his labors found himself cheated of the human soul he had expected by the substitution of a cock or some other animal. He would then in a rage have destroyed the work he had built, only the priest having blessed it immediately after its completion, Satan had no further power over it. We learn that the best place for the invocation of the devil is at four cross roads, at midnight, where, standing with a black hen in hand, and cutting it in two, one must pronounce three times the sacred formula: *Eloim, Essaim frugitavi et appellevi*; information which we submit for the use of any engineers or contractors now in distress.

We also find in the volume an interesting chapter upon the bridges of fantasy, among which are the bridge of Rama built by the King of Mankeys from Asia to Ceylon, that Rama might go over to recover his divine Sita; the bridge of the Turks, over which they must cross to enter Paradise (the bridge Sirat), narrower than the edge of a sword, and suspended above the abyss of hell. "The bridge of dread, No broader than a thread" of the Scotch ballad; and finally the arch in the sky which, according to the Edda, is the bridge uniting this earth with heaven.

As to the most modern of public works, railroads, it is almost surprising to find how much they were retarded in early days in Europe by prejudices; with what superstitious terror they inspired the common people upon the continent, very nearly approaching that of the Chinese at present. The Bishop of Orleans issued a special prayer for the use of such as should travel by train. The difficulties and dangers anticipated by the great Arago are well known; he opposed the transport of troops by rail, our author states, lest they should become effeminate and lose the power of making long marches! The college of medicine in Bavaria prognosticated serious cerebral troubles to passengers, and to the public who should witness such rapid passage of vehicles.

Other very interesting chapters concerning the use of the divining rod give a more complete account of its history than we know of anywhere. In spite of the declaration of Paracelsus, "*Virgula divinatoria fallax est*," intelligent persons continue its use to this day; the late Charles Latimer, known to many of our readers, wrote a book about it and practiced with it.

We have given only a very incomplete account of this volume of 600 pages, which concludes with a copious bibliography, revealing the extent of the author's researches, and very valuable to students of folk lore and to librarians.

The United States of America. A story of the American Commonwealth, its Natural Resources, People, Industries, Manufactures, Commerce, and its Work in Literature, Science, Education and Self-Government. Edited by Nathaniel Southgate Shaler, S. D., Professor of Geology in Harvard University; Dean of Lawrence Scientific School. Two volumes with many illustrations. Royal octavo. Pages 670 and 650 with map and index. New York: D. Appleton & Co., 1894.

It is probably about three years since the Appletons put into the hands of Dr. Shaler the project of bringing out a work which should consist of a series of monographs by specialists, arranged around a central idea and co-ordinated by one editor, and which should cover the physical, intellectual and industrial development of the United States. The last of the two beautiful volumes in which the project is carried out has appeared within a month or two. The editor contributes seven of the papers; the other contributors are Mr. W. L. Wilson, M. C.; Mr. J. R. Soley, formerly Assistant Secretary of the Navy, Mr. Edward Atkinson, Colonel T. A. Dodge, Colonel George E. Waring, Jr., Prof. J. B. McMaster, Mr. Charles Dudley Warner, Major J. W. Powell, Dr. William T. Harris, Dr. Lyman Abbott, Mr. H. H. Bancroft, Prof. H. P. Judson, University of Chicago; Judge Cooley and Mr. C. H. Cooley, Mr. Charles Francis Adams, Dr. Sargent, Director of the Harvard Gymnasium; Mr. A. E. Kennelly, formerly Assistant to Mr. Edison; Dr. Gilman, President of Johns Hopkins University; Mr. H. G. Prout, Mr. F. D. Millet, Prof. Taussig, Harvard University; Mr. Henry Van Brunt, Mr. H. P. Fairfield, and Dr. S. W. Abbott, of the Massachusetts Board of Health. The editor says in his preface that "one need of the American of to-day is to have the America of to-day unrolled before him like a map, in order that he may survey its natural features, its achievements and the position which it has attained among the nations. Such a presentation demands that the results of many investigations be put in convenient order and that this work be done by writers who are recognized authorities in the various subjects." Further, the editor believes that as the tasks have been executed in this work it affords a better means for a clear understanding as to the position of the American citizen to-day than is elsewhere to be found.

Dr. Shaler himself writes especially of the geology, physical geography and similar broad natural conditions; Major Powell of the Indians, Mr. Soley of the maritime industries, Colonel Dodge of the military resources, Judge Cooley and his son and Mr. Prout of the railroads, Mr. Atkinson of productive industry, Mr. Adams of cor-

porate action in our civilization, Colonel Waring of cities, Mr. Warner of literature, Mr. Millet of art, Mr. Van Brunt of architecture, Prof. McMaster of political organization, and Dr. Abbott of the place of the individual in American society. Altogether the project seems to us novel and attractive and the result to be valuable and remarkably interesting.

The Bankers' Magazine, December, 1894. New York: John G. Floyd, 233 Broadway. Monthly: price, \$5 per year, single copies 50 cents.

The December number of this serious and respectable publication is No. 1 of Volume 50, and with this issue the magazine takes a new form and wider scope. It has passed under the control of Mr. John G. Floyd, for nearly 30 years associated in the publication of the *Commercial and Financial Chronicle*, who lately sold his interest in that journal. Mr. Floyd has enlarged the magazine to upwards of 150 pages and increased the size of the page and introduced several new features. The December issue contains a portrait of Mr. George S. Coe, President of the American Exchange National Bank, with a sketch of his life. This is followed by two pages under the title of "The Financial Spirit of the Month," in which the most important features of transactions and of the markets are compactly summarized and which gives a valuable and concise table of general statistics for four months, giving bank clearings, rates for money, exchanges and sales and quotations of a few of the most important securities. The general articles which follow are on the bond issue, the various currency plans and the world's wheat situation. Two pages are given to bank clearings for six months.

An interesting department of the magazine is "The World of Finance and Business," which is filled with selected articles from various publications, well chosen. Another department is "Recent Laws and Decisions," edited by Professor Albert S. Bolles. This is followed by "The Banker's Forum," devoted to communications from bankers. Then follow reports of meetings and conventions; banking and miscellaneous news; money, trade and investments and financial reports and statistics, including bank statements for all the principal cities of the country.

We should suppose that the magazine in this new form would be an important and valuable addition to the periodical literature of finance, commerce and social science, and we trust that it will give, particularly in the "Banker's Forum," an opportunity for the bankers of the country to exert some of that influence on public opinion which they ought by their intelligence and their position in the community to exert. It has often seemed to us remarkable that the financial theories and practice of the nation are so little affected by the influence of the men who are in actual business as presidents and officers of banks. It would naturally seem that the sum of the knowledge of bankers of the all-important and difficult problems of a national currency and a stable standard should be made available to the public either through a national association's reports or through discussions such as *The Bankers' Magazine* has initiated. The combined opinions of bankers should be as authoritative on intricate questions of currency as that of physicians on the treatment of disease. The ordinary citizen who dips even lightly and in an amateurish way into the study of finance, learns nothing so surely or so quickly as the fact that he is not entitled to an opinion.

Sixth Annual Report on the Statistics of Railways in the United States; for the year ending June 30, 1893. Washington: Interstate Commerce Commission.

A preliminary edition of a part of this report was issued about a year ago, giving statistics for 145,870 miles of road; now we have the full report, covering 170,656 miles. As this report is a year and five months behind its date, the Secretary considers it proper to make some explanation regarding the time consumed in its preparation and issue. The railroads are allowed two and one-half months as a necessary and reasonable time in which to file reports. Many roads do not file these reports until from six to ten months after that date. Then, several months are required by the Statistician to verify and adjust data. An amendment to the Interstate Commerce Act requiring the filing of the railroads' reports within the time prescribed by the Commission and providing a penalty for non-compliance is now before Congress.

Sundry Engineering Literature.—The American Society of Civil Engineers has issued a list of duplicate books and pamphlets now in the house of the Society, which are offered for sale or exchange. The list covers some 2,000 titles and some of them are rare and valuable. It has been impracticable to fix prices, but anybody who wishes to obtain any of these publications, either by purchase or in exchange, is requested to communicate with the Secretary of the Society at 127 East 23d street, New York, who is empowered to make arrangements. The opportunity is a rare one, for the library of the Society is in need of more room, and this duplicate material must be cleared out soon even if it is sacrificed.

The Use of Compressed Air. By Mr. Addison C. Rand. New York: The Republic Press, 14 Lafayette place. Only seven months ago we reviewed this little volume which had then just been published. The publishers now inform us that the first edition has been exhausted and the second is on the press.

TRADE CATALOGUES.

Compressed Air.—The Clayton Air Compressor Works issues a sheet containing a list of uses to which compressed air is applied in the ordinary course of industry. The length of the list is quite surprising and it includes many curious applications. The company furnishes special designs of air compressors for unusual uses.

The Wheel, the Rail and the Shoe.—Under this title the Sargent Co., of Chicago, issues a small pamphlet explaining the principle on which the Sargent brake shoe has been designed and made. This is a shoe patented by Mr. W. D. Sargent last July, and was described in the *Railroad Gazette* of Dec. 14.

TECHNICAL.

Manufacturing and Business.

The Richmond Standard Spike & Iron Co., now has its plant at Manchester, Va., running on double time, employing about 100 men. The works at Manchester have been idle since January of the present year.

The Kansas City Car & Foundry Co. has started up its works at Kansas City, Mo., and expects to operate them continuously for three months on present orders.

The Westinghouse Electric & Manufacturing Co. has a contract with the West End Street Railroad of Boston for 110 motors for the electric cars of that company.

The Buckeye Iron & Coupler Co. has been organized as the successor of the Buckeye Malleable Iron Co. It has already taken possession of the works of that company which will be considerably enlarged for the manufacture of malleable iron castings and structural iron work. The incorporators of the new company are W. Goodspeed, T. P. Linn and others.

C. S. Scott, liquidator of the Hamilton Bridge Company, limited, of Hamilton, Can., which made an assignment some months ago, will sell the buildings, machinery, real estate and other property belonging to that company on January 25 next. The bridge works at Hamilton, Ont., are eligibly situated near the Grand Trunk Railroad Station, and a railroad siding has been built through the property. Much of the machinery is new and the equipment is very complete. There are also facilities for ship building and the property includes an excellent dock yard.

The Directors of the Westinghouse Air-Brake Co. have declared the regular quarterly dividend of five per cent., payable Jan. 10 to stock of record Jan. 1.

The Naugatuck Malleable Iron Co., at Naugatuck, Conn., has placed the contract for a new annealing room, 94 ft. x 175 ft. with the Berlin Iron Bridge Co. The company is now building a new gas house roof for the Massachusetts Reformatory, at Concord, Mass., and the iron work for the new office building of the Pope Mfg. Co., at Hartford, Conn.

The King Bridge Company, of Cleveland, O., is considering the erection of branch bridge works at Sioux City, Ia. Some of the officers of the company have recently been at Sioux City in connection with this matter. The King Bridge Company is largely interested in the elevated railroad at Sioux City, owning a majority of the bonds of the Sioux City Rapid Transit Company, which operates the road, and the suggested site for the proposed bridge works is at Morningside, a property near the terminus of the elevated railroad.

A new rotary snow plow has been built by the Leslie Manufacturing Co., of Paterson, N. J., for the Southern Pacific Railroad and has recently been shipped to California.

The Ewald Iron Co., of St. Louis, owners and operators of the Tennessee rolling mills, in view of the frequent inquiries for a hexagon-shaped iron for railroad purposes, are manufacturing regularly at their mills in Louisville, Ky., all sizes hexagon bar iron from $\frac{3}{8}$ -in. to $1\frac{1}{2}$ -in. diameter.

The Railway Car Ventilation Co., of New York City, has been incorporated in New York with a capital of \$15,000, and J. B. Newcombe, Frank McAuliffe and William E. Newcombe of New York City as Directors.

Phosphor-copper and phosphor-bronzes are being more and more extensively used. The peculiar change which copper and bronzes undergo when fluxed with phosphorous are not well understood, but the effects are fully appreciated, strength and toughness are increased and liability to corrosion decreased. For these reasons phosphor-bronzes are being used very largely in marine and railroad machinery. The charging of the phosphorous into the molten metal must be done with considerable system and care. This part of the operation may be safely and easily accomplished by the aid of phosphorous chargers or phosphorizers made of plumbago. The Joseph Dixon Crucible Co., Jersey City, N. J., who make plumbago goods in great variety for metallurgical purposes, also make these phosphorizers in different sizes, suited to the size of the crucible in which the fluxing is to take place.

The Fontaine Crossing & Electric Co., of Detroit, Mich., has recently appointed Mr. F. P. Thorp as their representative in the West. His headquarters will be in the Rookery Building, Chicago.

The Niles Tool Works, of Hamilton, O., received last month several large orders for a general line of machinery from France through their agent in Paris. They are now working full time and employing a nearly full complement of men.

Iron and Steel.

R. C. Neal, of Harrisburg, President of the Tysone Iron Works and Harrisburg Rolling Mill Co., has leased the Hollidaysburg & Gap Iron Works, which have been idle since 1889, for three years, from the first mortgage bondholders.

The Pennsylvania Steel Co. had every department except two in operation last week, and most of the mills will be run on full time this week. The prospects for work in the rail mills the remainder of the month have shown an improvement but the outlook for January is dull. It is expected to begin preparatory work this week on the changes to be made in certain mills.

The lower works of the Cambria Iron Co., with the exception of the blast furnaces, will be closed during Christmas week. Some necessary repairs are contemplated, but it is not on that account that the shutdown is to be made. The 48-in. blooming mill goes off this week and will be closed three weeks for repairs. The company has decided to abandon the Archer fuel gas at the blooming mill and to return to coal produced gas, arrangements for which are now being made. The gas by the Archer process was made from crude petroleum, and was introduced at the time of the failure of the natural gas four or five years ago. The natural gas is not now, and has not for some years, been used in any other department of the mills.

The Ontario Malleable Iron Works at Oshawa, Ont., were totally destroyed by fire last week, causing a loss of \$120,000.

New Stations and Shops.

The town of Washington Court House, O., has offered the Ohio Southern a bonus of \$50,000 to remove its shops from Springfield, O., to that town and the offer will probably be accepted.

New shops for the Union Pacific, Denver & Gulf, are to be erected at Trinidad, Col. The buildings will include car, repair, blacksmith and machine shops, and all the departments of the present shops will be considerably enlarged. Much of the new machinery has already been ordered.

The Martin Anti-Fire Car Heating Company's fine shops at Dunkirk, N. Y., are likely to be sold to the Hartford Axle Company, of Connecticut, which is now negotiating for the sale of the buildings. The company asks the people of Dunkirk to subscribe for \$30,000 worth of its stock.

The increase in electrical business now being done by the General Electric Co. has necessitated an extension of its already extensive facilities at Schenectady, and two large buildings are now being constructed by Grattan & Jennings, builders, of Buffalo. One of these is a storehouse 353 ft. long and 52 ft. wide. The foundations are already laid and the superstructure is going up. This will relieve the smaller storehouses now found entirely inadequate. The other building will be used as a laboratory for standardizing. It will be erected on the outskirts of the tract of land owned by the company at Schenectady, in order that it may be as far away as possible from the disturbing influences of moving iron and heavy electric currents in and around the many buildings of the plant proper. This laboratory will contain all the standard instruments of the company, and with these the working instruments, which are in use throughout the factories for testing purposes, will be compared each day.

Sixty Foot Rails.

The Columbus, Hocking Valley & Toledo is the latest company to have 60-ft. rails rolled for experimental use. About one mile of track has recently been laid on this road with rails of that length. It will be remembered that the Pennsylvania has laid a few miles of track with 60-ft. rails and the Lehigh Valley has put in some 45-ft. rails.

The Keystone Union Suit.

An interesting and quite important patent case has recently been decided in the United States Circuit Court of Appeals sitting in Pennsylvania. It was on the appeal of a case from the United States Circuit Court of the Eastern District of Pennsylvania. The case was one in which an attempt was made to get over a patent of undisputed priority and merit by a slight change in the form of the material used; in other words, to "beat" the patent. The case was that of the Keystone union for steam pipes, and was brought by Messrs. E. P. Paynter, Jr., and John K. Moore against Messrs. Thomas Devlin & Co. The claim in question is for a union for steam pipes comprising a threaded nut, a member having a seat of soft metal with a concave face and an opposing member with a convex end. In the lower court Devlin & Co. were adjudged to have infringed the claim and the Court of Appeals sustains this, Judge Acheson writing the opinion. The Judge describes the difference between the union shown by the patent in suit and the union alleged to have infringed the claim in suit as follows: In the latter the convex face is on the head member and the concave face on the tail member, reversing the arrangement of the patent. Again, in the defendants' (appellants' in upper court) union the convex face is composed of soft metal, whereas in the union described in the patent it is the concave face which is of soft metal. In other words, the position of the soft metal face has been transposed, but this transposition of the parts does not avoid infringement; simply the gist of the invention has been appropriated. The changes in the more recent device do not affect either the principle of operation or the result, and there is a substantial identity between the unions. In the judg-

ment of the Court the earlier patents and exhibits illustrative of the prior state of the art do not anticipate the invention in question. The claim covers a union patentably new and useful.

THE SCRAP HEAP.**Notes.**

Representative Fielder, of New Jersey, has introduced a bill in Congress limiting the rates for berths in sleeping cars.

The cases of the United States against 24 railroad employees in Missouri, for violation of law at the time of the strike last July, have been dropped by order of Attorney-General Olney.

The Legislature of Virginia has rejected a bill providing for separate cars for white and colored passengers; the Lower House of the South Carolina Legislature has passed such a bill by a small majority.

Judge Jenkins, in the United States Court at Milwaukee has issued an order directing the receivers of the Northern Pacific to decline to obey notices of garnishment or other processes to get hold of employees' wages.

S.H. Bell, Ticket Agent on the Philadelphia & Reading at Camden, N. J., has secured a verdict of \$20,000 against the road for damage to his reputation caused by being arrested on a charge of forging the endorsement of an employee on a salary check. He was acquitted on trial.

The Denver Union Depot Co., has sued the Denver Consolidated Electric Light Co. for \$60,000 on account of the fire of last March, which greatly damaged the station building. The ground of complaint is that the fire was caused by unsafe wires whose bad condition was due to negligence on the part of the Electric Light Company.

The Secretary of Internal Affairs of Pennsylvania, has refused to accept the annual report of the Ontario, Carbondale & Scranton, a branch of the New York, Ontario & Western, because it was not filed within the time required by law; and he has notified the Attorney-General to collect the penalty of \$5, provided for by the law of 1889.

The Chicago, Milwaukee & St. Paul is using for all new coupon tickets the safety paper made by the Hoskins process. The appearance of the paper indicates that the water marking or impression made by the dandy roll changes the color of the pulp so that the mark, which consists of large letters, may be clearly read on both sides of the ticket.

F. W. Phelan, the Manager of the American Railway Union strike at Cincinnati, who was imprisoned by Judge Taft for six months for contempt of court, was released on Dec. 13, and on the next day E. V. Debs, President of the Union, was sentenced by Judge Woods at Chicago for a similar term. The other leaders at Chicago were sentenced to three months.

Oscar Rogers was sentenced to death at Florence, Ariz., on Dec. 13 for train robbery, he having been one of the three men who stopped a passenger train at Maricopa on Sept. 30. One of the other men, Arney, pleaded guilty and was sentenced to 30 years' imprisonment. A negro train wrecker has been sentenced at Augusta, Ga., to imprisonment for life. The derailment which he caused resulted in the death of the engineer. It was at Millen several months ago. Aval Johnson, one of the train robbers who stopped a Southern Pacific train at Roscoe, Cal., was sentenced last week to imprisonment for life.

A suit has been begun at Hillsboro, Ill., to compel the Cleveland, Cincinnati, Chicago & St. Louis to stop the "Knickerbocker special" at that place, which is a county seat. The law of Illinois requires all regular passenger trains to stop at county seats. The defense of the road is that this is not a regular passenger train, but is engaged exclusively in carrying passengers from St. Louis to points in other states, mostly for through passengers, and that it does not sell any tickets nor take any baggage from points in Illinois to other points in said state, and that, therefore, it is regulated by interstate commerce laws and is not subject to the laws of Illinois.

Under an order made by the United States Court at Cincinnati, the wages of the employees of the Chesapeake, Ohio & Southwestern are to be restored to what they were when a reduction of 10 per cent. was made. It affects those whose wages remained on the reduced scale after January 1, 1894, and the restoration is to the scale in effect before the reduction in the fall of 1893. The order was made in consequence of the statement contained in the receiver's report that the earnings for the month of October, 1894, exceeded those for October, 1892, by about \$3,000. The court, having control of the railroad, held that the letter of Manager Echols to J. W. Whedon, chairman of the Employees' Committee during the disputes of 1893, was a contract by which the road was bound to restore the wages of all employees to the scale in force prior to October 1, 1893.

Lake Notes.

The Minnesota Iron Co., which is building two steel ton barges of 5,000 tons capacity, is negotiating for two more, giving it a fleet of 12 ships. Besides these it is said to be contemplating the building of a steel steamer, 420 ft. over all, 48 ft. beam and 28 ft. deep, a vessel which will carry 7,000 gross or nearly 8,000 net tons. Such a ship could enter but one Lake Michigan harbor, that of South Chicago and could not get into Cleveland or Buffalo. It would be restricted to the ore and coal trade between Duluth and Ashtabula.

Leading Lake Superior iron companies are already ne-

gotiating for tonnage for next year at a little higher rate than has ruled of late.

Duluth and Superior received and shipped 4,400,000 and 2,100,000 tons of freight respectively by lake in '94, or a combined total about as great as Chicago's. Duluth increased 2,000,000 tons over the preceding year.

Dock Privileges at New York.

The White Star Steamship Line has filed application with the New York Dock Board for two of the new piers that are to be built above Tenth street on the North River. Application has also been made by the Cunard Steamship Co. for another one of the new piers.

Lake Traffic for 1894.

The preliminary report of General Poe on the traffic passing the lock of the St. Mary's Falls Canal for the season of 1894, 234 days, is now at hand. The net registered tonnage was 13,110,366 tons. Comparing the two largest canals of the world we have for registered net tonnage passing both:

	St. Mary's Falls.	Suez.
1891	8,400,685	8,698,777
1892	10,647,203	7,712,028
1893	9,849,754	7,659,068
1894	13,110,366

This year's gain over last was at the rate of 34 per cent., but in actual freight carriage the gain was only 22 per cent., showing a larger proportion of vessels going up light than last year. A great deal of this is due to the coal strike. The largest gain in freightage is in iron ore, viz.: 63 per cent., and the next is in passengers, which increased from 18,869 to 27,236, or 45 per cent. The shipments of flour were 8,965,773 barrels, but the shipments of grain were only 36,414,491 bushels, a loss of 20 per cent. Shipments of "unclassified" freight, mostly packages, increased from 415,180 to 451,185 net tons, and lumber increased from 588,545,000 to 722,788,000 ft. At the same time the shipments from Saginaw and Bay City increased from 173,540,000 to 178,059,011 ft. But Bay City and Saginaw are manufacturing an increasing amount of lumber, which is shipped by rail. The freight tonnage passing through the canal at the "Soo" this season was 13,195,860 net tons, valued at 142,114,502 or \$10.85 per ton.

The shipments by lake from Chicago and South Chicago for the season were: Flour, 2,190,285 barrels, and grain of all sorts, 64,446,687 bushels. The average lake freight for carrying a bushel of corn from Chicago to Buffalo was 1.19 cents. The lowest average was in July, when the daily rate averaged 0.9 cent. The increase of milling in the West is shown by the fact that the aggregate shipments of flour from Chicago and Duluth increased by 2,564,484 barrels, and the aggregate shipments of wheat from the same ports decreased by 1,802,061 bushels.

The Canadian Soo Canal.

The Minister of Railways and Canals, Ottawa, is calling for tenders for the construction of a pair of lock gates for the "Soo" Canal.

For a Canal Survey from Lake Erie to the Ohio.

Representative Storer of Cincinnati, has introduced in the House a bill increasing from \$20,000 to \$50,000 the appropriation for surveying the proposed Lake Erie-Ohio River Canal routes in the State of Ohio. This does not include the proposed routes in Pennsylvania.

New Hamburg-American Steamship.

The Hamburg-American Line's new steamship, Patria, arrived at New York last week on her first trip from Hamburg. The Patria was built in the yards of the Vulcan Ship Building Co., at Stettin, Germany, and was launched in October last. She is of the twin-screw type, and on her trial trip, in November, her engines developed 4,353 indicated horse-power, with which she obtained an average speed of a little over 14 knots, with a maximum of 15.32 knots. The vessel is 460 ft. long, 52 ft. wide and 35 ft. in depth, and is of 7,118 gross registered tonnage. There are accommodations for about 50 first-class passengers. Particular attention has been paid to the construction of the steerage rooms, and 2,500 passengers can be comfortably accommodated. Besides passengers and dead-weight freight, the vessel has accommodation for 500 head of cattle, and cold-storage rooms for 500,000 lbs. of dressed meat.

From the Atlantic to the Great Lakes.

Senator Vilas, of Wisconsin, will propose an amendment to the sundry civil appropriation bill to provide for an international commission to investigate and report upon the feasibility of a canal large enough to accommodate ocean-going ships between the Atlantic Ocean and the Great Lakes, to consist of three members to be appointed when Great Britain shall appoint a like number for Canada.

Securities Listed on the New York Stock Exchange.

The Governing Committee of the New York Stock Exchange has added to the lists for dealings railroad securities as follows:

Cleveland & Pittsburg, \$502,000 additional general mortgage 4½ per cent. guaranteed gold bonds, series B, making the total amount listed, \$1,245,000.

New York, Susquehanna & Western, \$450,000 additional terminal first mortgage 50 year five per cent. bonds, making the total amount listed \$2,000,000.

Pittsburg, Shenango & Lake Erie, \$786,000 first mortgage 50 year five per cent. gold bonds.

Electrical Work in the Baltimore Tunnel.

The Maryland Steel Co. has secured the contract for making and erecting the overhead electrical equipment for use in the Baltimore Belt tunnel. The work will cost about \$80,000. Instead of using an overhead wire for the circuit, the General Electric Co., which is building the motors to haul Baltimore & Ohio trains through the tunnel, has decided to build an iron trough 1½ ft. in circumference. A flexible wire will be attached to a shoe fitted into this iron work, and will by this means carry the current, to the motors of the engine. The purpose in using the hollow trough and the shoe is to avoid delays which may occur in the slipping off of the trolley wheel. Another advantage is secured in having a flexible wire for the electric connection instead of an upright iron pole, which does away with the necessity of shifting the pole every time it is desired to reverse the engine. The iron trough will be of heavy workmanship and the work built to support it will be of light iron bridge construction. Iron poles will be placed 30 yards apart for that portion of the track inside the tunnel. On these poles will rest a framework of light iron, which in turn will support the trough. In the tunnel the trough will be near the center of the tunnel roof. There it will be held in place by iron braces, also placed 30 yards apart, and fastened by bolts to the side of the tunnel arch. The overhead work will extend from Henrietta and Howard streets on the south to a point north of Huntingdon avenue, where the tunnel work of the Belt Line ceases.

Blast Furnace Capacity and Iron Production.

The capacity of furnaces in blast on the first of this month was 178,325 tons per week. This compares favorably with the capacity of the same date a year ago, viz.: 98,089 tons. It is the largest weekly capacity returned since May, 1893, 186,982 tons. The weekly capacities since the commencement of 1891, with the production, are given below:

	1891.	1892.	1893.	1894.
January 1.....	163,281	191,442	175,701	102,999
February 1.....	139,359	193,007	175,385	108,321
March 1.....	120,745	193,827	177,210	115,069
April 1.....	113,316	188,109	182,169	132,383
May 1.....	116,586	175,343	186,982	104,472
June 1.....	147,799	172,890	177,407	65,419
July 1.....	167,424	169,850	160,952	86,529
August 1.....	174,502	158,581	115,926	114,506
September 1.....	174,506	156,194	83,481	149,398
October 1.....	181,818	161,558	77,334	158,567
November 1.....	192,743	173,925	84,635	171,414
December 1.....	193,009	175,111	98,089	178,325
Production.....	8,279,870	9,157,000	7,124,502

The production of the first half of this year was only 2,717,983 gross tons, and the *American Manufacturer* estimates the production for the last half at 3,858,166 tons, or a total for the year of 6,600,000 tons. We shall have to go back to 1888 for so small an output in any calendar year, but for the 12 months comprising the last half of 1893 and the first half of this year, the make of pig iron was only 5,279,567 tons, or about equal to the figures of 1886. Our average make, and approximately our consumption, for the four and a half years commencing with January, 1889, was at the annual rate of 8,623,586 tons, but for the last year and a half the production and consumption has been in the neighborhood of 6,000,000.

Machinery for the Washington Navy Yard.

The Navy Department recently received bids for the following machines for the Washington Navy Yard: Two 30-inch slotting machines designed for very heavy work; Niles Tool Works, \$8,790; Bement, Miles & Co., \$7,920.

Four horizontal boring and drilling machines to bore to the center of a 69-in. circle, Niles Tool Works, \$11,600; George Place, \$11,160; Bement, Miles & Co., \$10,960. One 40-horse power engine to supply power for blowers in forge shop; Manhattan Supply Co., \$895; the Forsaith Machine Tool Co., \$755; Niles Tool Works, \$650; Elliott Machine Co., \$598.99; Armington & Sims Engine Co., \$675.

One electric traveling crane, lifting capacity 25 tons, and one electric traveling crane, lifting capacity of 10 tons; Yale & Towne Mfg. Co., \$11,584; Morgan Engineering Co., \$9,572; Manning, Maxwell & Moore, \$10,985; the Industrial Works, \$20,300.

One 12-ft., one 10-ft., and one 8-ft. vertical boring and turning mill, Niles Tool Works, \$11,485; Bement, Miles & Co., \$11,450; the Pond Machine Tool Co., \$10,310.

Two planing machines to plane 18-ft. long, 8-ft. wide and 8-ft. high, and two machines to plane 14-ft. long, 4-ft. high and 4-ft. wide, Bement, Miles & Co., \$17,000.

Two portable drills, capable of drilling holes up to 3-in. in diameter over a surface of 56-in. diameter at one setting, the Forsaith Machine Tool Co., \$575; Manning, Maxwell & Moore, \$577; Frank Clouds, \$576.

Two horizontal boring, drilling and milling machines to bore to the center of a circle 140-in. in diameter; the Niles Tool Works, \$14,900; Bement, Miles & Co., \$13,920. One universal radial drill, distance from center of column to end of arm to be not less than 108 in.; the Niles Tool Works, \$2,495; Bement, Miles & Co., \$2,450.

The 24-in. shaping machines; W. H. Warren Machine Tool Works, \$4,900; the Niles Tool Works, \$3,280; Bement, Miles & Co., \$3,400.

Ten differential pulley hoists, capacity two tons, to hoist 9 feet, Yale & Towne Mfg. Co., \$178.50; Forsaith Machine Tool Co., \$155; Manning, Maxwell & Moore, \$174.50; George Place, \$412; Elliott Machine Co., \$330; Frank Clouds, \$195; Maris & Beekley, \$270.—*Iron Age*.

Railroad Logging in the Northwest.

The most prominent feature of logging operations in the northwest this winter will be the work of the two logging railroads, the Brainerd & Northern Minnesota, and the Duluth, Mississippi River & Northern, both of which are of standard gage, well built, general traffic roads. Together they will handle not less than half of the timber cut of the Mississippi River and tributaries, completely changing the methods of former years. These two roads will haul logs from the skidways to the banking grounds on the river, and last winter, which was the first the D. M. R. & N. did any great amount of traffic, it had at one time on the banking ground at the mouth of the Swan River the enormous quantity of 45,000,000 feet of logs, this exceeding any previous banking ground made anywhere. The main lines of these roads are of permanent construction, with heavy rails and good grades, while the short branches that run to the different roll-ways where the logs are hauled by team, are taken up as soon as the timber in the immediate neighborhood is cut, usually in a season or two. These branch lines are so arranged that the haul of logs from the stump to the tracks is very short, usually less than half a mile.

Besides these two roads, there are in Northern Minnesota several others, among them the road of the Cass Lake Logging Co., that of the Cloquet Lumber Co., and those of the C. N. Nelson Lumber Co., two or three short lines. Besides these, the Cranberry Lumber Co., and Mitchell & McClure, of Duluth, have logging roads, on one of which is a crib bridge across a ravine, nearly 1,000 ft. long and 65 ft. high. The general traffic roads of the section are also pressed into service as log carriers, and the business of lumbering has changed completely in the last season. Not less than 500,000,000 feet of logs will be hauled by the roads mentioned in the coming winter, most of which could be taken out by water in the old way, were it deemed desirable.

LOCOMOTIVE BUILDING.

The Toledo, Peoria & Western has let four locomotives to the Rogers Locomotive Works.

The Cincinnati, Hamilton & Dayton has let three locomotives to the Pittsburgh Locomotive Works.

CAR BUILDING.

The Washington Coal Co., is asking bids on 300 coal cars.

The Fitchburg is building 24 passenger cars in its own shops.

The Wheeling & Lake Erie is asking bids on 12 passenger cars.

The St. Paul & Duluth is asking bids on about five passenger cars to replace those which were burned in the forest fires last September.

The Missouri, Kansas & Texas is preparing specifications for 700 furniture, 800 box and 500 coal cars. It is expected that bids will be called for early in January.

The shops of the Pennsylvania Lines at Columbus, O., are working on orders for platform cars. Altogether about 35 freight cars will be built at the Columbus shops this year.

The Columbus, Hocking Valley & Toledo has contracted with the Michigan-Peninsular Car Co. for 1,000 coal cars, 100 to be built now and 900 later. The Oliver Coke & Furnace Co. is asking bids for 150 coal cars and 50 platform cars.

The Queen & Crescent order for freight cars talked of some time ago has not yet been contracted for. The cars to be ordered will include box, coal and platform cars, and probably orders for 250 will be given out, although the number has not yet been settled upon. The cars are to fill vacant numbers in the company's equipment and it has not yet been decided how many of these will be filled, although it is stated that the number will not be more than 250.

The new works of the Lenoir Car Co., at Lenoir, N. C., have started up this month on an order for the Southern Railway Co. for 400 hopper bottom coal cars. The original contract was for 250 cars with a contingent order for 250 more. The Lenoir Co. also has an order for 100 cars for the Knoxville & Ohio Railroad. The removal of the shops from Knoxville was completed some time ago and everything is now in readiness at the Lenoir plant for turning out car work. The officers of the company are W. P. Chamberlain, President, and R. Z. Roberts, Vice-President and General Manager.

BRIDGE BUILDING.

Abbeville, La.—The Commissioners of Vermilion Parish, and the town authorities are likely to unite in the construction of an iron bridge, to cost about \$10,000, to be built at this town in place of the present wooden structure.

Edmundston, N. B.—Application will be made at the approaching session of Parliament for the incorporation of a company to build bridges across the St. John River at Claire, St. Helaire, Edmundston and St. Leonard's, New Brunswick. Malcom & Ross of Edmundston, are solicitors for the company.

Galveston, Tex.—The plans for the new bridge over Galveston Bay are being prepared by the engineer of the Toledo Bridge Co., and will be submitted to a board of local engineers within the next week for their approval.

Hamilton, Ont.—Engineer Hillman has been instructed to prepare plans for a steel viaduct along Cannon street for the Hamilton Radial Railway. It is estimated that the cost of the viaduct will be about \$200,000.

Montgomery County, Pa.—Among the work contemplated by the Montgomery County Commissioners for next year is the erection of three bridges; one over the Wissahickon in Whitemarsh Township and two over Zacharias Creek—one in Skippack and the other in Worcester Township.

Montreal, Que.—At the last meeting of the Road Committee the contract for the extension of the Notre Dame street bridge across the Canadian Pacific's tracks, where the new East End Station is to be erected, was awarded to the Dominion Bridge Co., of Montreal, at the tender of \$34,737.

Last week Mr. Pusey appeared before the Railway Committee of the Privy Council, at Ottawa, on behalf of the Brockville & New York Bridge Co., and applied for the approval of a contemplated change in the St. Lawrence Bridge, of the span of 672 ft. and three spans of 226 ft. each to a span of 672 ft. and two spans of 436 ft. each. The proposed change was approved.

Philadelphia.—The Port Wardens of Philadelphia, to whom Chief Engineer Brown, of the Pennsylvania Railroad, has applied for the authority of the Board to erect its proposed Delaware River Bridge from Frankford, in the northern part of the city, objects to the proposed height of 50 ft. for the bridge as inadequate. Chief Engineer Brown replied to their objections that it would increase the cost of the structure at least 25 per cent. to meet the wishes of the Board for a greater height above the water for the structure. It seems likely that the Port Wardens will refuse to authorize the erection of the bridge unless a greater height than 50 ft. is provided for, but no formal decision has yet been given out.

South St. Paul, Minn.—The bridge being built by the South St. Paul Belt Line Railroad over the Mississippi River at South St. Paul, will be a single track railroad and double track trolley road structure, double-deck or with the railroad floor at the top chord, and the highway floor at the bottom chord of the pin connected spans. The metallic structure consists of 19 spans, beginning at the east bluff as follows: One girder span, 24 ft. 8 in.; one span, 45 ft.; one span, 40 ft.; one span, 30 ft.; two spans, 40 ft.; one span, 30 ft.; two spans, 40 ft.; one draw-span, 440 ft.; five fixed spans, 140 ft., and one girder span 50 ft., followed by a timber trestle. The masonry is now completed and the erection of the iron work is to begin during the week. The material of the superstructure is open hearth, medium steel. The bridge is being built from designs furnished by C. F. Loweth, Chief Engineer. The Pittsburgh Bridge Co. has the contract for the entire structure.

Toledo, O.—After inspecting the various sites proposed, the Bridge Committee of Councils passed a resolution last week favoring the location of the up-river structure at Fassett street and Walbridge avenue. The City Engineer was instructed to communicate with the State Board of Public Works in regard to a permit for the location of a bridge at that point. Plans must also be submitted to the State Board. They will be advertised for. The structure will have a roadway of either 24 or 32 ft. and two 6-ft. sidewalks.

Advertisements for bids for a new bridge over Swan Creek at Perry street have been published. The bids will be opened Jan. 7.

Washington, D. C.—A bill has been introduced in Congress appropriating \$600,000 to construct the proposed memorial bridge across the Potomac River at Washington and providing that the District shall pay one-half the cost. It is stipulated that the bridge shall not be occupied by steam or street railroads.

MEETINGS AND ANNOUNCEMENTS.**Dividends.**

Dividends on the capital stocks of railroad companies have been declared as follows:

Connecticut River, semi-annual, 5 per cent., payable Jan. 1.

Northern Central, semi-annual, 4 per cent., payable Jan. 15.

Worcester, Nashua & Rochester, \$2.50 per share, payable Jan. 2.

Boston & Albany, \$2 per share, payable Dec. 31.

Boston & Lowell, 3½ per cent., payable Jan. 1.

Chicago & Northwestern, 1½ per cent. on the preferred stock and 2½ per cent. on the common stock, payable Jan. 3.

Cleveland, Cincinnati, Chicago & St. Louis, quarterly, 1½ per cent., payable Jan. 1.

Columbus, Hocking Valley & Toledo, semi-annual, 2 per cent. on the preferred stock, payable Jan. 2.

Pennsylvania & Northwestern, semi-annual, 2 per cent., payable Jan. 10.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlantic & Pacific, annual, Boston, Mass., Dec. 13.

Cleveland & Pittsburgh, annual, Cleveland, O., Jan. 2.

Maine Central, annual, Portland, Me., Dec. 19.

Brooklyn Elevated, annual, Brooklyn, N. Y., Jan. 2.

Cleveland & Pittsburgh, annual, Cleveland, O., Jan. 2.

Philadelphia & Reading, annual, 12th and Market Sts., Philadelphia, Pa., Jan. 14.

Pickering Valley, annual, Philadelphia, Pa., Jan. 14.

Rome, Watertown & Ogdensburg, annual, New York City, Dec. 28.

Western New York & Pennsylvania, annual, Philadelphia, Pa., Jan. 14.

Wheeling & Lake Erie, special, Toledo, O., Dec. 22.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October, at 10 a. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station, on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.36 p. m. Address P. O. Box 333.

The *Foundrymen's Association* meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

The *Western Foundrymen's Association* meets in room 701, Western Union Building, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

The *Association of Civil Engineers of Cornell University* meets on Friday of each week at 2.30 p. m., from October to May inclusive, at their Association Rooms in Lincoln Hall, Ithaca, N. Y.

American Society of Civil Engineers.

At the meeting of Dec. 5, Mr. John Thompson read a paper on "Platen Presses," notice of which we have already made. At the meeting of Dec. 19, Mr. Guy B. Waite read a paper on "Wind Bracing in High Buildings," and Professor Mansfield Merriman, on the "Strength and Weathering Qualities of Roofing Slate." At the meeting of Jan. 2, Mr. Hunter McDonald will present a paper on the "Bridge Over the Tennessee River at Johnsonville, Tenn."

The annual meeting will take place on Wednesday and Thursday, Jan. 16 and 17, the programme of which will be issued later. The Committee of Arrangements consists

of Messrs. Charles Warren Hunt, Assistant Secretary of the Society; Charles H. Myers and A. W. Trotter.

Western Society of Engineers.

The chief business before the last meeting of the Western Society of Engineers at the Grand Pacific Hotel related to the proposal to withdraw from the Association of Engineering Societies. As stated last week the vote on this question was unfavorable. The vote was announced as 137 against the proposition for withdrawal to 70 in favor of that proposal. The Directors of the Armour Institute having offered the Society the use of the meeting room in the Institute it was voted to accept the invitation and to hold every other meeting of the Society at the Institute. The technical discussion was on the paper read some time ago by Henry Goldmark on "Strains and Deflections of Solid Bridge Floors."

Engineers' Club of St. Louis.

The annual meeting of the Club was held on Dec. 5, with President Crosby in the chair and 26 members and nine visitors present. The President read the report of the Executive Committee and said that the total membership of the club had remained unchanged during the year, the elections and resignations just balancing. During the year an agreement was made with the Missouri Historical Society for the use of their meeting room by the Club, and for a separate room to be used as a library and reading room and open on week days. Six of the papers read before the Club have been approved for publication in the Journal of the Engineering Association. The Secretary reported that 18 meetings have been held during the year, with a total attendance of 537 members and 107 visitors. The membership is now 179, 127 being resident members and 52 non-resident and one honorary.

PERSONAL.

—Mr. Amos Green has resigned his position as General Manager of the Quincy, Omaha & Kansas City Railroad, in Missouri, to take effect Jan. 1.

—Monroe Wilder, who has been Roadmaster of the Buffalo Division of the New York Central for many years, has resigned. Mr. Wilder has been in the service of the company since 1849.

—Mr. John B. Mitchell, for 30 years Superintendent of Bridges and Buildings for the Wabash Railroad, and for five years holding a similar position with the Big Four, died last week of typhoid fever at Lafayette, Ind., aged 63 years.

—Mr. John H. McGuire, Roadmaster of the Pittsburgh Division of the Western New York & Pennsylvania Railroad, aged 59 years, was run over and both legs cut off by the caboose of a working train at Lake View, N. Y., and died Dec. 16.

—Mr. W. A. Carpenter, formerly General Freight and Passenger Agent of the Eastern Minnesota, has been appointed General Manager of the Detroit Car Service Association and Joint Weighmaster of the Detroit Weighing & Inspection Bureau.

—Mr. C. Stein, Superintendent of Transportation of the Toledo, Ann Arbor & North Michigan Railroad, has tendered his resignation, to take effect Jan. 1. Roadmaster D. McEntaffer also resigned his position on account of poor health.

—Mr. John S. Wilson, who was at one time General freight agent of the Pennsylvania Railroad Co., and was subsequently at the head of the Poughkeepsie Bridge system, has returned to New York city from Europe, where he has been for over a year.

—Hon. Judson C. Clements has been nominated to serve another term as Interstate Commerce Commissioner. Judge Clements was first appointed Interstate Commerce Commissioner in March, 1892, succeeding to the vacancy caused by the death of Commissioner Bragg.

—Mr. W. L. Cowles has been appointed Chief Engineer of the Bridge Department of the Pottsville Iron & Steel Co., Pottsville, Pa. Mr. Cowles was formerly Chief Engineer of the Youngstown Bridge Co., and Assistant Superintendent of the North Works of the Illinois Steel Co.

—Mr. G. M. Gruber, who has been connected with the Gulf, Colorado & Santa Fé for four years, latterly as Chief Clerk to the General Manager, has been appointed Assistant Superintendent of the Eastern Minnesota, a part of the Great Northern Railway, and will have his office at West Superior, Wis.

—Mr. W. F. Bradley has been appointed General Superintendent of the Toledo, Ann Arbor & North Michigan Railroad. Mr. Bradley has been Superintendent of Motive Power of the road since January, 1892, and he was previously Master Mechanic for about a year. He will remain in direct charge of the mechanical department.

—Mr. John Worthy, of Chicago, the President of the Metropolitan Elevated Railroad and various financial institutions of Chicago, died in the City of New York last week, following a surgical operation. Mr. Worthy was an important figure in the city politics and commercial interests of Chicago. He had a long business career, and had held many positions of trust. He was one of the organizers of the Commercial Loan & Trust Co., and was President at the time of his death.

—Mr. Calvin Pardee has been elected President of the Lehigh Coal & Navigation Co. to succeed the late E. B. Leisenring. The announcement of the election of Mr. Pardee to the Presidency was erroneous. Mr. Pardee is a son of Ario Pardee, Sr., the founder of the firm of A. Pardee & Co., and the proprietor of many large operations in the anthracite coal fields of Pennsylvania, and has been for over thirty years. He was formerly a director of the Lehigh Valley road.

—An informal reception and complimentary dinner was given to Col. W. P. Craighill, Corps of Engineers, U. S. A., President of the American Society of Civil Engineers, by members of the Am. Soc. C. E., resident in Philadelphia and vicinity on Monday evening, Dec. 10, at "The Stenton," Philadelphia. Covers were laid for 61 guests. The following toasts were responded to: "Our Guest," Col. Wm. P. Craighill; "The American Society of Civil Engineers," Mr. Chas. Macdonald; "The Means and Methods of More Firmly Cementing Our Friendship Together," Mr. R. W. Lesley; "The Engineering Achievements of the Day," Mr. J. C. Trantwine, Jr.; "Iron and Steel," Mr. John Fritz; "Our Mechanical Brothers," Mr. Oberlin Smith; "The Manufacturing Engineer," Mr. James Christie; "Transportation," Mr. Theodore Voorhees.

—Mr. Frank S. Gannon has been appointed General Manager of the Staten Island Rapid Transit Railroad. Mr. Gannon has been General Superintendent of the railroad for over eight years and as such has been in charge of the property, so that the present appointment is chiefly

a change of title which will be gratifying to Mr. Gannon and his friends as a recognition of his successful management of the property. The road is not a very long line, but it has required very intelligent management to make it a paying property as Mr. Gannon has been able to do. The road runs along the shores of Staten Island in New York Harbor, and during the summer a part of the line has a large excursion traffic and there is also a considerable regular suburban traffic through the year. Besides this it receives the freight traffic of the Baltimore & Ohio destined for New York Harbor, which comes over the great drawbridge over the Arthur Kill built by Mr. Alfred P. Boller. Mr. Gannon was appointed General Superintendent of the New York Division of the Baltimore & Ohio in 1890 and will continue to hold that position.

ELECTIONS AND APPOINTMENTS.

Batavia & Northern.—A meeting of the Directors was held in Brooklyn last week and officers were elected as follows: President, Gen. Robert Avery, New York; Vice-President, William H. Hazard, Brooklyn; Secretary and Treasurer, George A. Wingate, New York; Directors, James H. Cox, New York; William Cole, Brooklyn; Dwight S. Beckwith, Albany; Dr. Ernest Wende, Buffalo; David D. Lent and Oren C. Steel, Batavia; R. Schermerhorn, Chief Engineer and Superintendent.

Big Laurel & Panther Creek.—The first general meeting of the incorporators of the company was held in Selius Grove, Pa., last week. The following board of directors was elected: George K. McGaw and Charles T. Davis, of Baltimore, Md.; T. E. Carson, of Virginia; John L. Miller, W. J. Gortner, Oden C. Gortner and J. M. Boyer, of Pennsylvania. The Directors elected W. J. Gortner, President; John L. Miller, Vice-President and Treasurer, and J. M. Boyer, Secretary.

Carrabelle, Tallahassee & Georgia.—M. B. Rice having resigned the position of Superintendent of the Carrabelle, Tallahassee & Georgia Railroad Company and the Gulf Terminal & Navigation Co., the office of Superintendent of these companies has been abolished.

Mr. T. R. Geer having resigned the position of Auditor, F. W. Armstrong has been appointed Auditor of the following companies, with office at Tallahassee, Fla.: Carrabelle, Tallahassee & Georgia Railroad; Gulf Terminal & Navigation Co.; Georgia & Florida Investment Co., and Scottish Land & Improvement Co.

Lake Erie & Western.—John W. Doane, of Chicago, one of the Receivers of the Union Pacific, and Hon. Erskine M. Phelps of Chicago, have been elected Directors of the railroad in the places of John B. Corse, counsel of the company, and George F. Store, of the New York Central.

Lehigh Valley.—The ticket recommended by the management of the railroad to be voted for at the annual election on Jan. 15 has been announced as follows: President, E. P. Wilbur; Directors, Charles Hartshorne, William L. Conyngham, William W. Ingham, Robert H. Sayre, James I. Biakeslee, John H. Fell, John B. Garrett, Charles O. Skeer, Beauveu Borie, Joseph Wharton, Thomas McKean, and C. H. Myers. This board embraces three new names of prominent stockholders, Messrs. Wharton and McKean, of Philadelphia, and Myers, of Bethlehem, Pa. These gentlemen take the places of William H. Sayre, Rollin H. Wilbur and Henry S. Drinker officers of the company, who remain in the service in their respective positions, but who have retired from the Board of Directors.

Montpelier & Wells River.—Mr. P. J. Batrd's resignation having been accepted to take effect Dec. 31, the office of Traffic Manager will be abolished on that date. All correspondence and reports heretofore sent to the Traffic Manager should be sent to F. W. Morse, General Freight and Passenger Agent, Montpelier, Vt.

New York, New Haven & Hartford.—Peter E. Bowman, who for the past year has been in charge of the company's terminal at Harlem River, New York, has resigned and will be succeeded by William E. Chamberlain, until recently General Manager for the Armstrong Transfer Co. of New York, who will have the title of Assistant Superintendent of the New York Division.

New York, Susquehanna & Western.—Frank E. Smith has been appointed General Freight and Passenger Agent of this company, vice I. J. Demarest, resigned.

Philadelphia, Wilmington & Baltimore.—J. E. Gilmore, Assistant Supervisor between Havre de Grace and Baltimore, has been promoted to the position of Superintendent of Signals, with headquarters at Broad street station, Philadelphia. Frank Brown, of Monongahela City, will be Mr. Gilmore's successor.

Pennsylvania.—R. T. Morrow has been appointed Assistant Engineer of the Elmira & Canandaigua Division, succeeding B. H. Nicholas, promoted. George B. Beale has been appointed Assistant Engineer of the Middle division of the railroad, vice B. F. Morrow, transferred.

Santa Fé, Prescott & Phoenix.—The Directors of the company, at the annual meeting held in Chicago last week, elected the following officers: F. M. Murphy, Prescott, Ariz., President; G. W. Vaughn, Prescott, Vice-President, General Manager and Chief Engineer; C. C. Bowen, Detroit, Secretary and Treasurer; F. J. Sarmiento, Chicago, Assistant Secretary; G. W. Kretzinger, Chicago, General Counsel; F. A. Healy, Prescott, Auditor and General Freight and Passenger Agent; F. M. Murphy, G. W. Vaughn, and C. C. Bowen, Executive committee.

Superior, Eastern & Southern.—A meeting of the stockholders was held at Sheboygan, Wis., Dec. 8. The following Directors were elected: John Hunner, of Madison; Frank Geele, of Sheboygan; R. H. Laire, of St. Louis; C. Perkins and John Cameron, of Chicago. Officers elected are: Frank Geele, President; R. H. Laire, Vice-President; J. D. Cameron, Secretary and General Manager; John Hunner, Treasurer. The charter of the company was only recently secured.

Savannah River.—At a meeting of the Directors of the company held Dec. 13, at 40 Wall street, New York, the following officers were elected: President, E. J. Carter; Vice-President, W. R. Busenbark; Secretary and Treasurer, Charles A. Baldwin. This railroad is a connection of the Florida Central & Peninsula Railroad, at Ellaville, Fla.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Bellefonte Central.—All work on the extension of the railroad from State College to Pine Grove, Pa., has been temporarily suspended. It is stated that the road will be completed and trains running before March, 1895. Over one-half of the distance is graded and the rails are laid for that much of the line.

Central of New Jersey.—A party of surveyors,

under J. H. Thompson, have been engaged between Silver Brook and Switchback, along the Catawissa Mountain, completing surveys for the new branch which that company intends building from Tamenend, Pa. The new line, it is said, will be run almost parallel with the Philadelphia & Reading for the greater part of the distance. The Silver Brook Yard will also be enlarged.

Chicago & Northwestern.—The reports being printed of surveys being made by engineers of this company for new branch lines in Wisconsin, have for their foundation merely the work on preliminary surveys through the company's land grants in Wisconsin. No definite extension is in view and it is not likely that the present preliminary work will be followed up by locating surveys.

Clearfield, Conemaugh & Western.—It is now announced that active construction work between Porters' and Irvona, Pa., will not be commenced until early spring. The surveying for the remaining portion of the line between Irvona and Johnstown continues however. No contract has been as yet let. Hon. S. J. McConeil, of Harrisburg, Pa., is President, and Samuel Brugger of Flemington, Chief Engineer.

Choctaw, Oklahoma & Gulf.—George S. Good & Co., of Lock Haven, Pa., who have the contract to build about 125 miles of new road for this company, to connect the Eastern and Western divisions now in operation, have let all the sub-contracts for grading. The connecting line will be built from South McAlester to El Reno, I. T. The following list gives the names of the sub-contractors east from Oklahoma City:

J. W. Powell, sections 1 to 6 inclusive, 6 miles; John A. O'Keefe, sections 7 to 12 inclusive, 6 miles; Ware, Maney & Co., sections 13 to 32 inclusive, and sections 51 and 52, 22 miles; M. A. Wogan, sections 33 to 42 inclusive, 10 miles; A. F. Burke, sections 43 to 47 inclusive, 5 miles, and T. S. McCoy, sections 48 to 50 inclusive, 3 miles. The addresses of all these contractors is Oklahoma City, O. T. The contractors working west from South McAlester, are: J. H. Barrett, sections 11 and 12 inclusive, 2 miles; Connelly & Doyle, sections 13 and 14 inclusive, 2 miles; H. Hansen, section 15; W. H. Corder, section 16; Dowling & McGunnigle, sections 17 to 19 inclusive, 3 miles; J. E. Collins, sections 20 and 21; Ward & Elliott, section 22; Wm. O'Connor, section 23; Ferguson Con. Co., sections 24 and 25; also 44 to 53 inclusive, 10 miles; Pat Rail, section 26; Jas. Crowley, sections 27 to 29 inclusive, 3 miles; John H. Howard, sections 30 and 31; Joseph Meehan, sections 32 to 35 inclusive, 4 miles; A. J. Yawger & Co., sections 37 to 40 inclusive, 4 miles, and A. W. Scott, sections 41 to 43 inclusive, 3 miles.

Dallas Terminal Railway & Union Depot Co.—This company filed a charter in Texas last week. It is formed for the purpose of constructing a railroad from Dallas to Plano, Collin County, and Fort Worth, with the right to build a belt line around the City of Dallas. The incorporators are: W. C. Connor, Barnett Gibbs, Philip Sanger, O. P. Brown, J. E. Schneider and others.

Delaware & Hudson.—It is reported that the Delaware & Hudson Canal Co., which controls the Adirondack Railroad from Saratoga for 60 miles to North Creek, N. Y., proposes to extend that road to the upper end of Long Lake, a distance of 30 miles. This will allow of a more direct entrance to the northern wilderness over the Delaware & Hudson route to the Saranac and Lake Placid region. The owners of private property along the route have granted a free right of way over their property for the proposed extension.

Duluth, Red Wing & Southern.—It is reported that the negotiations for a loan have been completed and that the road will be extended from Red Wing, Minn., to Lake Superior during the coming year. L. F. Hubbard, Red Wing, Minn., is General Manager of the road.

Fredericksburg & Lancaster.—At a meeting at Fredericksburg, Va., this week of citizens of the Northern Neck of Virginia, this railroad company was organized under a charter granted by the Legislature of Virginia. This charter is for a road from Fredericksburg to West Virginia.

Galveston & Great Northern.—A charter for this company was filed in Texas last week. This corporation is formed to construct a railroad from Galveston to Denison, Tex. The incorporators are: E. Roemer, of New York; P. J. Doherty, R. C. Shearman, George Brann, Franz Kohfeldt, W. S. Neoms, Sam Starr, E. E. Hanna, W. W. Bostwick and A. H. Coffin of Denison, Tex.

Great Northern.—Some important work has been done in the last few months improving the roadbed on the Western divisions of this company. The most important work has been in changing the grade at several points on the Cascade and other divisions, relocating the line on a higher grade to avoid the damage from high water during the winter and spring months which has been serious in previous years. The new grade through the Wenatchee Valley was completed a few days ago. Porter Brothers, of Seattle, have the contract for raising the track along the Kootenai Valley near Bonner's Ferry, Idaho. About nine miles of the grade at this place on both sides of Bonner's Ferry is to be rebuilt, a good deal of the new grade being about 6 ft. higher than the present roadbed. Considerable changes have been made in the bridges at this point. Much work has also been done in the construction of new snow sheds and on the west side of the Cascades this work is now about completed. The building of snow sheds on the line through the Rocky Mountains is still going on. Altogether about 600 ft. of sheds will be built on the line through those mountains.

Gulf & Interstate.—Officers of the railroad report that the road from Bolivar Point to Beaumont, Tex., a distance of 70 miles, is graded to a point nine miles from Beaumont, and that the grading into Beaumont will be finished by Dec. 20.

Gulf Shore & San Antonio.—Work on the construction of the railroad is rapidly progressing. Saunders Station, twelve miles southeast of San Antonio, Tex., has been opened to business. The road has been built 14 miles southeast of the Alamo City, and there is material on hand to lay six miles more of track. It is expected that 14 miles more of the road will have been completed before Christmas.

Hardwick & Woodbury.—The act to incorporate this company recently issued in Vermont, provides for building a railroad from a point on the St. Johnsbury & Lake Champlain road in Hardwick to the mountain quarry of the Woodbury Granite Co., in the town of Woodbury, Vt., less than five miles. The company is not to be compelled to operate its line of railroad except in the months of April to November, inclusive, in each year. H. Henry Powers, George W. Hendee, I. Downer Hazen, Truman C. Fletcher, Charles A. Watson, William H. Fullerton, George M. Powers, William B. C. Stickney, Alfred E. Watson, of Hartford, Vt., Edward H. Blossom and Hiram N. Turner.

Illinois Coal.—Articles for the incorporation of the railroad company were filed at Springfield, Ill., last week. The incorporators are: Benjamin Crawford, J. Beard, J. G. Holden, L. Platte, and C. R. Fera, all of Danville, Ill. It is proposed to build the road from Vermilion County to Chicago, with branches from Vermilion to Joliet and Danville.

Indiana, Illinois & Iowa.—The new extension of this road, from Knox to South Bend, Ind., 33.4 miles, was opened for traffic Dec. 16. By this extension the road not only gains access to the valuable business at South Bend, amounting to over 30,000 cars a year, exclusive of less than carload shipments, but shortens the mileage from its western terminus at Stretator to its connections on the east from 25 to 45 miles. The Three I's is now the only road entering South Bend making direct connections with every factory on both sides of the river and has the short line mileage from South Bend to St. Louis, the Missouri River and generally to southern points. The extension has a maximum grade of 16 ft. to the mile, and at present the service consists of one passenger and three regular freight trains each way, daily. By this connection a direct outlet is also given for the Stretator coal at South Bend. The extension has caused several changes in junction points with Eastern lines. Connection is now made with the Michigan Central, Lake Shore and Grand Trunk at South Bend, instead of New Buffalo, La Porte and Wellsboro, respectively; with the Ft. Wayne at Hamlet, instead of Hanna; with the Baltimore & Ohio at Walkerton instead of Wellsboro; with the Wabash at North Liberty instead of McGee; with the Lake Erie & Western at Walkerton instead of Belfast.

Lehigh Valley.—On Dec. 11 the second track on the cut-off from Maxwell, Pa., to Oliver's Mills was opened. This work, with the two-mile siding near Maxwell, is six miles long, and the cut-off branch is now entirely double-tracked, with the exception of five miles west of Oliver's Mills. The contract for double-tracking that distance has been placed, and the work will be pushed forward to speedy completion.

Marquette, Tomahawk & Western.—The grading has recently been commenced on this road which is to be built from Tomahawk to Marquette, Wis. M. H. Bradley, of the town of Tomahawk, is President, and F. G. Stark is Secretary and Treasurer.

Mexican, Cuernavaca & Pacific.—The annual meeting of this company was held in Denver, Col., on Dec. 8. The reports of the officers gave an account of the progress of the construction work. About 40 miles of the road is now in operation from the City of Mexico to near Cuernavaca. A stage line connects the present terminus of the road with that city. The total length of the line is to be 250 miles from the City of Mexico to the city of Acapulco on the Pacific Coast. The line has been substantially built and on the Mountain Division is laid with 66-lb. rails. The portion now under construction includes the heaviest work on the line. It crosses the mountains at an elevation of 9,882 ft., but beyond this summit the grade to the coast will be an easy one. The ties have been secured from forests along the line and the road is being ballasted with volcanic cinder, which proves to be an excellent material for this work. The road now open has been operated for 54 per cent. of the gross earnings. The route beyond Cuernavaca to the coast passes through a rich and fertile country with many undeveloped natural resources. The harbor of Acapulco is the finest on the Pacific Coast south of San Francisco. J. H. Hampson, the contractor at Mexico City, who secured control of the railroad about a year ago, was re-elected President at the Denver meeting, and Charles Wheeler Secretary.

Midland Terminal.—This branch of the Colorado Midland has been completed to Victor, Col., where the principal mines in the Cripple Creek district are located, and within 30 days trains will be running to the City of Cripple Creek. Victor is a few miles south of the town of Midland, to which trains have been running from Denver since the early summer.

Moss Point & Pascagoula.—This railroad in Southern Mississippi is to be opened this month for the first four miles from Scranton to Moss Point. Connection is made with the Louisville & Nashville at Scranton, and the southern terminus of the road at Pascagoula, is on the Gulf of Mexico and that point will be reached within 30 days, when the length of the line will be six miles. G. H. Howze is President, and W. J. Clark, of Moss Point, Miss., is Chief Engineer. The work has been done under J. V. Halbert as contractor.

New Roads.—Gregory Barrett, Solicitor of Carberry, Manitoba, has applied to the Dominion Parliament for a charter for a railway from Clearwater on the Canadian Pacific through Baldin, Glenboro, Carberry, Neepawa, on the Manitoba & Northwestern Railroad.

Orting, Wash.—The contract for building the bridge across the Puyallup River at Orting has been let by the County Commissioners to the Tacoma Bridge Co. for \$2,940.

Ottawa, Amprior & Parry Sound.—Construction work on the railroad west of Long Lake, Ont., has been discontinued for the season. About 70 miles of the road yet remains to be built to reach the western terminus at Parry Sound, Ont. During the past summer 77 miles of track were laid. The surveying party, now locating the western end, will complete its work in January. The line is now finished to Long Lake at which point a branch is being built to the St. Anthony Lumber Mills, which includes a bridge across the Mada waska River.

Path Valley.—The first consignment of rails for this extension of the Newport & Sherman's Valley from New Germantown to Fannettsburg, Pa., a distance of about 24 miles, arrived at Newport last week. Grading is far advanced, but it will take some time to complete the tunnelling on the mountain dividing the two valleys. It is expected to complete the line next summer. David Gring of Newport is President and General Manager.

Pemiscot.—The officers of the company now expect to have this road completed by Jan. 1. The road is an extension of the St. Louis, Kennett & Southern from Kennett to Caruthersville, Mo., on the Mississippi River 25 miles. The road passes through an alluvial region constituting a part of the upper portion of the St. Francois Basin. This whole district has been reclaimed by levee work constructed in the last two years. The line is level, with 3,000 ft. of trestle work. The road has been built by Louis Houck of Cape Girardeau, Mo., and \$150,000 of bonds have been issued or \$6,000 a mile, first mortgage six per cent, guaranteed by the St. Louis, Kennett & Southern. The latter road with this extension will be 45 miles long, extending from Campbell on the St. Louis Southwestern to the Mississippi River at Caruthersville. The latter town is located half way between Cairo and Memphis and has a fine harbor. The town is located on the site of the old Spanish Post known as "Little Prairie," and would seem to be destined

as soon as this railroad is finished to become an important point on the river.

Pennsylvania.—The railroad company has begun the extension of the Turtle Creek branch, which is now built from Walls Station, on the Pennsylvania Railroad, to Wilmerding, Pa. The work of grading for the extension has begun and the rails will be laid as soon as enough progress has been made to warrant it.

Pennsylvania Midland.—About six miles of track have been laid from Cessna north, and rails are now on hand to complete five miles additional, which will reach to Osterburg. Hon. Geo. B. Orlady, of Huntingdon, Pa., is President, and Edward Tennis of Thompsonstown, contractor.

Pittsburg, Brady's Bend & Lake Erie.—A charter was granted by the State Department of Pennsylvania this week to this railroad company. The line will be 20 miles long and will extend from Brady's Bend to Butler, Pa. The capital is \$600,000. The President is Joseph Pool, of New York, and the Directors Joseph Pool, Isaac Hough, David B. Erwin, Albert E. Peterson, and Richard H. Hoy, of Philadelphia, and F. W. Scheffmeyer and Haywood R. Pool, of New York City.

San Pete Valley.—The surveyors under O. R. Young, on the preliminary line of the proposed extension to Salt Lake City, has left the Juab Valley and is now camped in the Utah Valley between Santaquin and Provo. The preliminary line so far is an excellent location, and the descent from the slopes of Mount Nebo was made by an easy grade. From Payson, north, the line will probably be parallel to the other two roads, and so continue until Salt Lake is reached.

Sioux City & Forest City.—General Manager Smith, of the railroad, states that the company contemplates extending the line from Forest City to Bowdle, S. D., during the coming season, and arrangements to this end are now being perfected. Ex-Governor Bulkley of Hartford, President of the road, is urging the extension to Bowdle, believing that it will prove a profitable investment for the company, the route being through a well settled country.

South St. Paul Belt.—The company has now under contract and partly constructed a line of railroad from St. Paul Park connecting with the Chicago, Milwaukee & St. Paul and Chicago, Burlington & Northern at that place, to the St. Paul Union Stock Yards on the other side of the Mississippi River at South St. Paul. This road is four miles long, including the bridge over the Mississippi River. The grading of the east approach is being done by F. N. Truxa of St. Paul Park, and the grading on the west side of the river by A. S. Weymouth & Co., South St. Paul. Charles Stone, of St. Paul, is contractor for the substructure of the Mississippi River Bridge, which is nearly complete. The Pittsburgh Bridge Co. has the contract for the steel superstructure, and shipments have already been begun. The road will be open for operation by April 1. The present officers of the company are Marcus Johnson, President; Frank P. Blair, Vice-President, and N. F. Shabert, Secretary.

St. Catharines & Niagara Central.—Bracey Bros. & Co., of Chicago, contractors, have the contract for the construction of the extension from St. Catharines to Hamilton, Ont.

Temiscouta.—This company is asking power to extend its road to a point on the Inter-Colonial Railroad at Berry's Mills or Moncton, N. B.

Wiscasset & Quebec.—The Directors of the railroad made a trip of examination over the 20 miles completed north of Wiscasset, Me., on the coast, recently, and it is expected to open up the road for travel this week.

GENERAL RAILROAD NEWS.

Arcadia, Gulf Coast & Lakeland.—This property is understood to have been purchased by James King, of Rome, Ga., for \$20,500 cash, the purchaser assuming unsettled claims against the road amounting to \$25,000. The portion of road now operated is about 20 miles long in Manatee County, one of the western counties of Florida. The project was started some years ago by Boston interests to build a railroad from Lakeland, a town near Tampa, and Plant City, through the west coast counties of Florida to Punta Gorda, two lines being projected to reach that point through the phosphate lands of that part of the State. Although a good deal of grading was done in 1891 and 1892 the only portion of the road ever put in operation was the 20 miles referred to above.

Atchison, Topeka & Santa Fe.—The Receivers of the railroad have filed two petitions in the United States Circuit Court at Topeka, Kan., for the cancellation of contracts previously made with the Atlantic & Pacific, and Wichita & Western Railroads. The Receivers assert that the contracts are inequitable and unjust and should be revoked. The claim of the Atlantic & Pacific road is that the Atchison and St. Louis & San Francisco roads agreed to pay a rental on its Mojave division of \$400,000 a month. The Atchison Receivers object to certain clauses in the contract and claim that it is sufficient basis for annulment. The other petition avers that a contract was entered into by the Atchison and the St. Louis & San Francisco with the Wichita & Western for a lease of the latter for a series of years. The Receivers of the Atchison have asked that this contract be also annulled. Both petitions have been referred to a special master in chancery. Receiver Walker explains that in this action of the Receivers in applying to the court for authority to terminate contract relations with the Atlantic & Pacific it is not their intention to affect in any way the present arrangements for handling its traffic. In investigating the contract relations between the Atchison and the St. Louis & San Francisco on the one hand and the Atlantic & Pacific on the other, it was found that by various old agreements the former corporations had undertaken not only to make good all losses in operating the Atlantic & Pacific, but also to pay various other obligations of the latter road, including interest on its 4 per cent. bonds. These contracts could not be properly carried out by the Receivers of the two former corporations, which now have become insolvent.

Buffalo, Attica & Arcade.—The New York State Board of Railroad Commissioners has given its permission for a change in the gage of this railroad from a narrow to standard gage. The change to standard gage will be completed this month between Attica and Arcade, N. Y., 26 miles. The road is being rebuilt by S. S. Bullis, of Olean, N. Y., who now controls the property. An account of the work was given in our issue of Nov. 2.

Chicago, Milwaukee & St. Paul.—President Cleveland has formally forfeited the right of way held by this company across the Sioux Reservation in South Dakota from the Missouri River at Chamberlain to the Black Hills. Officials of the company explain that the right of way was allowed to lapse a year ago. About 15 years ago, before the Sioux Reservation was opened, the St. Paul

company acquired by treaty with the Indians a right of way across their reservation and station grounds along the line and at the eastern terminus on the Missouri River at Chamberlain. When the act was passed in March, 1889, for opening the reservation the agreement with the Indians was confirmed by the act, but a proviso was attached by which the agreement was to be terminated and the right of way forfeited unless the road was built within three years—that is before February 10, 1893. The company has not constructed any road west of the river, and therefore its right of way is forfeited. The company deposited money with the Interior department to pay the Indians for the rights acquired and expects to get it back. The grant was paid for. It was deemed better to let it expire than to build the road at present. When the company wants to build, it can acquire the right of way under the general laws and at no greater expense, and can choose its time for building.

Included in the right of way was a tract of land of 180 acres lying within the limits of Chamberlain. The grant of 640 acres on the west bank of the Missouri River, opposite that town; a strip 290 ft. wide from the Missouri River to the Cheyenne River, 190 miles; and, in addition to this, the company was given 20 acres every ten miles for the whole distance across the ceded land, which were to be used for townsite purposes.

Central of Georgia.—The annual report for the year ending June 30, 1894, will soon be issued, and will show earnings as follows:

Division.	Gross.	Net.
Main line.....	\$2,522,935	\$953,512
Augusta & Savannah.....	201,854	56,034
Southwestern R. R.....	1,098,913	365,583
Savannah & Western.....	1,240,299	213,883
Savannah & Atlantic.....	16,258	5,439
Mont. and Eufaula.....	205,808	Def. 926
Mobile & Girard.....	217,671	76,433
Steamship companies.....	1,947,237	180,692
Total.....	\$7,450,975	\$1,850,650

In the year ending June 30, 1893, the earnings were:

Division.	Gross.	Net.
Main line.....	\$2,588,410	\$722,274
Augusta & Savannah.....	254,945	91,688
Southwestern.....	1,016,769	59,000
Savannah & Western.....	1,271,391	Def. 297,325
Savannah & Atlantic.....	23,089	Def. 16,874
Mont. & Eufaula.....	255,130	Def. 28,020
Mobile & Girard.....	207,925	11,532
Steamships.....	2,107,480	303,777
Total.....	\$7,725,139	\$846,052

Columbus, Hocking Valley & Toledo.—This railroad has ordered two new parlor cars from the Pullman Works, for service between Toledo and Columbus.

Des Moines, Northern & Western.—This railroad and the one-fourth interest in the Des Moines Union Railway Co., which the company controls, was sold in Des Moines, Iowa, Dec. 18, to G. M. Dodge, F. M. Hubbell, and F. C. Hubbell, the purchasing committee of bondholders, for \$2,340,000. Under the reorganization the present bonds will be funded at a lower rate of interest.

Detroit, Lansing & Northern.—The Directors announce that the plan of re-organization proposed to the security holders on March 6, 1894, has not received a sufficient assent to make it prudent to attempt to carry it out. The business of the current year has been disappointing and the prospects do not, in the judgment of the Directors, warrant an attempt to re-organize under foreclosure upon the basis of the proposed plan. The Directors are in consultation with some of the large holders of the different kinds of bonds with a view to the presentation of a new scheme to be carried out under foreclosure or otherwise as may seem most expedient; and at the suggestion of some of these bondholders, an effort is to be made to obtain a more correct idea of the relative values of the different parts of the system by keeping separate accounts of their earnings. This will consume some little time and must necessarily delay the preparation of a new plan.

Galveston, La porte & Houston.—Application will be made to the Texas Legislature to pass a special bill permitting the consolidation of the Laporte, Houston & Northern and the North Galveston, Houston & Kansas City railroads, and to change the name to the Galveston, Laporte & Houston Railroad. Four miles of the Laporte, Houston & Northern road have been reggraded since the present owners took charge, and track is being laid from the present terminus of the road to Laporte, which place will be reached in January. A preliminary survey is also being made from Laporte to North Galveston, to connect with the North Galveston, Houston & Kansas City road.

Illinois Central.—The company makes the following report of income from traffic for the four months ended Oct. 31, 1894 and 1893:

	1894.	1893.	Dec.
Miles operated.....	2,888	2,888	
Gross receipts from traffic.....	\$6,234,489	\$8,537,752	\$2,303,263
Oper expen & taxes.....	4,614,043	5,381,908	767,965
Net earn.....	\$1,620,446	\$3,155,844	\$1,535,298

The gross receipts for the month of November (1894 estimated) were \$1,746,738 in 1894, \$1,872,068 in 1893, and \$1,709,131 in 1892.

Laporte, Houston & Northern.—The company has filed a mortgage to the Union Trust Co., of New York, to secure \$3,000,000 for constructing the road at the rate of not exceeding \$15,000 a mile. The road is already constructed a number of miles and is to be built from the town of Laporte, Harris County, to the Sabine River, a distance of 145 miles. T. W. Ford is President of the company, and J. H. Tennant, of Houston, Secretary. A bill has been introduced in Congress granting the right to the company to bridge Buffalo bayou, Clear Creek and Galveston Bay, all in Texas.

Lehigh Valley.—John C. Hutchinson, of Philadelphia, one of the committee of stockholders recently appointed, has issued a circular this week requesting proxies of stockholders to be voted at the annual meeting of the company in January in opposition to the present Board of Directors. The committee does not propose any names for Directors, but states that if a fair number of proxies is received a public meeting of the stockholders will be held to discuss the affairs of the company and to suggest names for Directors. In the circular asking for proxies the committee does not state anything more specific than that the company has failed to publish recent and full statements of its financial condition. It points out that for 35 years the railroad was conservatively and successfully operated, but since July, 1893, it has paid no dividends nor has the officers given any information as to the company's condition. It states that the company is supposed to be hardly earning its fixed charges and to have a large floating debt. The amount of this debt cannot be ascertained from the company's published statements, but it is known that on Nov. 30, 1893, it was \$3,870,000, secured by bonds of the Lehigh Valley.

Maine Central.—The annual report of the Company for the year ended Sept. 30, 1894, shows:

Passenger.....	\$1,786,036	Dec.	\$244,975
Freight.....	2,509,309	Dec.	173,016
Miscellaneous.....	265,793	Inc.	27,294
Gross earn.....	\$4,561,138	Dec.	\$390,697
Operating Expenses.....	2,846,884	Dec.	399,315
Net earn.....	\$1,714,254	Inc.	\$8,618
Other income.....	54,975	Dec.	4,860
Total net earn.....	\$1,769,229	Inc.	\$3,758
Charges.....	1,427,997	Dec.	19,539
Balance.....	\$341,232	Dec.	\$15,781
Dividends, 6 per cent.....	298,512	Inc.	22,264
Surplus.....	\$42,720	Dec.	\$38,045

The report notes the business depression of the year and the enforced rigid economies in operation. Much new construction that was contemplated was abandoned. Nothing was charged to construction for the year. Twenty new locomotives ordered are charged to operating expenses as delivered. Through maturing of bonds, the interest on \$2,000,000 will be reduced from six to five per cent., and on \$600,000 from six to four per cent. The passenger earnings of the past year were \$1,786,036, against \$2,031,011 in 1893. The freight earnings were \$2,509,309, against \$2,682,324. But there was an increase in receipts from mails from \$146,737 to \$171,976. Rentals paid increased from \$483,195 to \$715,593, while interest decreased from \$829,936 to \$601,513. The profit and loss account contains an important charge of \$146,065 discount and commission, chiefly expenses of refunding debt during the depressed financial times.

Nashville, Chattanooga & St. Louis.—At a meeting of the stockholders of the railroad at Nashville last week, the purchase of the stock of the Rome Railroad of Georgia, extending 18 miles from Kingston to Rome, Ga., was approved, and a resolution was adopted authorizing the issue of \$650,000 five per cent. income bonds on the Western & Atlantic Railroad, the proceeds to be used to reimburse the Nashville, Chattanooga & St. Louis for money expended in improvements.

New York & New England.—Judge Wallace, in the United States District Court at New York, has authorized the issue of Receivers' certificates by the Receivers to the amount of \$684,629. The proceeds are to be used in the purchase of rolling stock and in betterments. Authorization for this issue of certificates has been given by the United States judges having jurisdiction in Massachusetts and Rhode Island.

Oregon Railway & Navigation Co.—The Reorganization Committee of the holders of collateral trust bonds, John Crosby Brown, Chairman, announces that more than \$3,100,000 of the above mentioned bonds out of an outstanding issue of \$5,132,000 have been deposited with the United States Trust Co., of New York. They state that in view of the pendency of an action begun by the Farmers' Loan & Trust Co. to foreclose the consolidated mortgage, it is important that as many bonds as possible should be deposited without delay to protect the interests of the holders.

Oregon Short Line & Utah Northern.—A committee of holders of the consolidated mortgage five per cent. bonds and of the collateral trust bonds of the company has been formed to take proceedings for a separate receivership of the road. S. Eudicot Peabody, President of the American Loan & Trust Co., of Boston, is the Chairman. The total issue of consolidated five per cent. bonds is \$10,895,000, of which \$1,702,000 are either held by the Union Pacific Co. or are pledged for its debts. Of the remaining \$9,193,000, the committee, with the committee in Amsterdam, already controls over \$3,300,000.

Pennsylvania, Poughkeepsie & Boston.—This railroad was sold at Columbia, N. J., to-day for \$350,000 by Samuel H. Grey, Special Master. It was purchased by W. B. Scott, Chairman of the Reconstruction Committee, representing the bondholders. The rolling stock had been sold previously.

Peoria, Decatur & Evansville.—The Receiver of the railroad will pay interest on the first mortgage bonds of the Peoria Division from Peoria to Mattoon, Ill., before January 1. Interest has already been paid on the Evansville Division. On this division it amounts to \$38,000, and the money is now in the hands of the Receiver. This is part of the plan for a reorganization of the property under the second mortgage. No default will be allowed on the first mortgage, thus preventing a forfeiture and foreclosure.

Pittsburgh, Shenango & Lake Erie.—A statement has been issued giving the gross earnings, January to October, 1894, \$385,637, against \$415,752 for the same months last year, a decrease of \$30,114. This decrease was caused by a general strike of coal miners, continuing from February to August, inclusive, and by the general depression of business throughout the country. The pay rolls up to October decreased \$50,944 compared with the same months last year. In addition to the large shipments of ore now going forward, there are over 200,000 tons on the docks at Conneaut Harbor, stored there during the strike, which will go forward to Pittsburgh furnaces at the close of navigation. The present handling capacity of ore and coal at the docks is 600 tons per hour.

Savannah, Americus & Montgomery.—Judge Fish, of the Superior Court of Georgia, has entered a decree ordering the sale of this railroad under foreclosure of the first mortgage, to take place Feb. 28, 1895. The amount of this mortgage is \$3,250,000.

Sioux City, O'Neill & Western.—A foreclosure of this property has recently been ordered by Judge Caldwell, of the United States Circuit Court, as stated last week. This does not mean, however, the immediate sale of the property. The decision puts off the foreclosure until a decision has been announced in the pending litigation in Iowa. This matter is now before Judge Shiras, who is expected to announce his decision in January next. The contest is between J. Kennedy Tod & Co., bankers, of New York, and the Credits Commutation Co., of Sioux City, which was organized by Sioux City people to protect their interests in this railroad, the Sioux City & Northern, and in the proposed bridge across the Missouri River at Sioux City, and other properties. The present railroad is a reorganization of the old Nebraska & Western, commonly known as the Pacific Short Line. The railroad is now operated west of Sioux City for about 130 miles through Nebraska. The foreclosure was ordered on the first mortgage bonds amounting to \$2,340,000, on which the default in interests amounts to nearly \$250,000.

St. Johns & Lake Eustis.—It is currently reported that this property has recently passed into control of the Plant System and will be operated in connection with the other Florida lines of that company. The road connects with the Florida Southern at Leesburg and operates about 24 miles of railroad northeast of that point to Ft.

Madison and Astor. It was built in 1885 and was formally leased to the Florida Southern when that road was operated in connection with the Jacksonville, Tampa & Key West. A Receiver was appointed some time ago and is now in control of the railroad.

Toledo, St. Louis & Kansas City.—In the United States Circuit Court at Springfield, Ill., Dec. 12, the Union Trust Co., of New York, entered a motion for the appointment of a new Receiver for the railroad, and the sale of the property. Samuel R. Callaway of New York, is the present Receiver. Argument on the motion was set for January 3.

Union Pacific.—The statement of earnings for October makes the following comparison:

UNION PACIFIC.			
Month of October:			
	1894.	1893.	Changes.
Gross earn.....	\$2,514,887	\$2,653,415	Dec. \$138,527
Oper. exp. including taxes.	1,584,335	1,502,951	Inc. 81,383
Net earn.....	\$930,552	\$1,150,464	Dec. \$219,911
Ten months:			
Gross earn.....	\$19,485,104	\$23,418,860	Dec. \$3,933,756
Oper. exp. including taxes.	13,963,412	15,168,378	Dec. 1,204,966
Net earn.....	\$5,521,691	\$8,250,481	Dec. \$2,728,790
Oregon Short Line.—Month of October:			
Gross earn.....	\$511,633	\$502,360	Inc. \$9,273
Net earn.....	168,150	245,615	Dec. 77,464
Ten months:			
Gross earn.....	\$4,190,467	\$5,021,177	Dec. \$830,710
Net earn.....	1,994,328	1,953,158	Dec. 758,829

Western New York & Pennsylvania.—The railroad will be sold on Feb. 5 next at Pittsburgh under various decrees in several courts of the United States secured by a Philadelphia trust company. The property to be sold is to include the main line of the railroad from Buffalo to Emporia, Pa., to various branches now operating, amounting altogether to 635 miles of railroad.

Wilmington, Chadbourn & Conway.—In pursuance of a decree of the Circuit Court of the United States, made on August 24, in the case of the Baltimore Trust & Guarantee Co., trustee, against the Wilmington, Chadbourn & Conway Railroad, the property was sold last week. It was purchased for \$53,000, and will become part of the Atlantic Coast Line. The sale includes 53 miles of railroad from Conway, S. C., to Chadbourn, N. C., and there crossing the Wilmington, Columbia & Augusta Railroad and running to Hub, on the Lumber River, in Columbus County, N. C.

TRAFFIC.

Traffic Notes.

The Washington dispatches in the daily papers indicate that the pooling bill will not be considered by the Senate before the latter part of January.

It appears that the Attorney-General of Nebraska cannot appeal from Judge Brewer's decision on the freight rate law until he gets an appropriation from the Legislature.

The New York Central will abolish stop-overs on all except summer tourist tickets on Jan. 1, and will limit local tickets to one day after the date of sale. The usual stop-over at Niagara Falls on through tickets to and from the West will be continued.

The proposed change in the official classification by which shippers were to be required to strap cases of boots and shoes in order to secure first class rates, has been abandoned. Large shippers at Boston, Rochester and elsewhere protested that the cost of strapping would hurt their business.

The 12-mule team, which recently took a load of dried fruit from Fresno, Cal., to San Francisco in competition with the Southern Pacific Railroad, started home from the latter city on Dec. 5, with 10 tons of sugar. The reports state that the team and its freight went by boat to Stockton, 70 miles east in an air line, from whence the distance to Fresno is about 130 miles. The shippers of the sugar say that they intend to employ more teams.

Chicago Traffic Matters.

CHICAGO, Dec. 18, 1894.

The result of the hearing before the Board of Railroad and Warehouse Commissioners last week on the petition of the Chicago Freight Bureau for relief against jobbers in Ohio, Indiana and Michigan on shipments to interior Illinois towns, was the issuing of a request to roads and shippers to present to the Board such revised schedules as they desired, within 30 days. The Board intimated strongly that some action would be taken looking to an adjustment of the matter at the expiration of this time. This matter came before the commission on petition of the freight bureau in June, 1893, a voluminous document exhibiting in detail a schedule of rates to various towns and cities in Illinois to which rates from Toledo, Cincinnati and Detroit were less than the local rate from Chicago, or so nearly the same as to seriously interfere with the jobbers in this city. A second hearing was had in October, 1893, after which the commission advised shippers that it would suspend further action in the belief that some agreement could be reached between the shippers and the roads without the intervention of an order from the Board. The defense of the Illinois roads is that they are not responsible for the through interstate rates which makes such a state of affairs possible; that the local rates are only fair and remunerative, and that they should not be asked to reduce them to meet the through rates which are unreasonably low.

The conference of freight representatives, which has been in session attempting to arrive at some adjustment of the trans-continental situation, has taken an adjournment until January 14, without having made any substantial progress. The Southern Pacific demands that the rates from the Atlantic seaboard to California shall be no higher than from Chicago, Mississippi River and Missouri River points, and while urging an advance in rates, is unwilling that the present existing differential in favor of Chicago shall be maintained. The Atchison is willing to advance all the rates, and to agree to an advance from New York provided the differential in favor of Chicago and river points is maintained; in other words that rates from Chicago shall be advanced equally with any advance from New York; but the Southern Pacific wants to give its Sunset Route the same rates from New York as the Chicago lines can give from here. The other Chicago roads, of course, take a corresponding position with the Atchison, and say that if the Southern Pacific wants an advance in rates, as it claims, it can have it in this, but in no other way.

The Western roads have not yet been able to agree upon any plan to absorb the switching charge at the Union Stock Yards. A meeting was held last week to consider a proposition to advance live stock rates sufficiently to permit of the absorption of the \$2 charge without diminishing revenues, but several of the lines were unwilling to do so, making various excuses. An attempt will be made to further consider the matter. As it stands now, all the roads except the Atchison are charging the addi-

tional \$2; but from all that can be learned, the Atchison gets no business away from them. If this is so, either the shippers have such strong regard for the other roads that they are willing to pay \$2 a car additional for shipping over their lines, or are being satisfied in some other way. Apparently, however, one shipper at least is not satisfied, as a dispatch from Springfield says that James Brown, of Dwight, has filed a complaint with the Railroad & Warehouse Commission against the Alton, alleging extortion in charging him the additional \$2. The question of the abolishing of the charge by the Eastern roads is also under consideration. The Eastern roads have withdrawn the charge on everything but cattle and live hogs, on which they make a charge of \$1 per car for switching.

The Executive Committee of Presidents and General Managers of the Central Traffic Association, has organized by the election of President Ledyard, of the Michigan Central, Chairman and Commissioner Blanchard, of the Central Traffic Association, Secretary. After tinkering the 1895 pass, agreement in some minor points, and passing resolutions that the eastbound and export freight rate situation had improved, the meeting adjourned.

The Executive Committee of the Central Traffic Association, has decided that any of the roads having contracts on refrigerator car mileage in excess may protect them until January 1. All other lines, of course are at liberty to do the same. After January 1 no mileage on refrigerators in excess of 7½ miles a mile, shall be allowed by any of the lines, excepting that the route on the north shore of Lake Ontario, which has a contract to pay one cent a mile on these cars, may continue the same until the expiration of its contract, when the cars are loaded with dressed meats consigned to Boston and New England points. To equalize the difference on this business, the rate on dressed meats going to New England points via the north shore of Lake Ontario is to be advanced to 45 cents, commencing January 1. The rate on tank cars is made 7½ mills per mile until further notice. The roads all agreed that when the present contracts expired they would not renew them.

The General Managers' Association, in accepting the resignation of Mr. St. John, its Chairman, passed complimentary resolutions, which were ordered engrossed and presented to Mr. St. John. The General Managers present also signed a personal letter addressed to Mr. St. John, expressing their regret at his departure from Chicago.

The general meeting of passenger representatives for the consideration of the formation of a trans-continental association has followed the footsteps of the freight representatives' meeting, and taken an adjournment "subject to call." In the interim, however, a special committee will labor with the Canadian Pacific, hoping to arrive at some compromise basis before long. As the matter now stands, the Canadian Pacific is holding out for differentials on westbound business via Port Arthur and the Soo Line, and is also protesting against the action of the western lines in joining forces with the Grand Trunk in the payment of commissions on westbound immigrant business from Canadian ports. The Western roads are willing to compromise on the differential question so far as regards Port Arthur business, but say that they will never allow differentials to the Soo Line, nor will they change their policy regarding immigrant commissions until the Canadian Pacific joins the immigrant Clearing House agreement. At the present writing there is little encouragement in the outlook for the formation of a new association for some time to come.

The National League of Commercial Travelers, is asking the roads, by circular letter, to subscribe to their club, intimating that they could be of valuable assistance in encouraging business. The whole business has a suspicious appearance of coercion about it, and the officials who have received the letters are inclined to look with disfavor upon the proposed scheme.

Eastbound rail shipments last week showed as light decrease, while the lag end of the lake business was cleared up. The advanced westbound rates are being generally well maintained. There are as usual charges that some manipulation is going on, but it is so slight that the association officers feel satisfied with the general situation.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending Dec. 15, amounted to 40,486 tons, against 45,433 tons during the preceding week, a decrease of 4,947 tons, and against 80,661 tons for the corresponding week last year. The proportions carried by each road were:

ROADS.	WEEK TO Dec. 15.		WEEK TO Dec. 8.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	2,251	5.1	2,344	5.5
Wabash.....	2,675	6.7	4,145	9.1
Lake Shore & Mich. South..	5,526	13.7	5,020	11.0
Pitts., Ft. Wayne & Chicago.	5,346	13.3	7,064	15.5
Pitts., Cin., Chi. & St. Louis	5,975	14.8	6,458	14.2
Baltimore & Ohio.....	3,135	7.8	3,441	7.6
Chicago & Grand Trunk.....	5,477	13.5	4,718	10.3
New York, Chic & St. Louis	3,258	8.1	4,877	10.7
Chicago & Erie.....	4,958	12.3	5,503	12.0
C., C. C. & St. Louis.....	1,885	4.7	1,863	4.1
Totals.....	40,486	100.0	45,833	100.0

Of the above shipments 2,386 tons were flour, 12,874 tons grain and mill stuff, 8,345 tons cured meats, 8,018 tons dressed beef, 1,281 tons butter, 1,589 tons hides, and 4,165 tons lumber. The three Vanderbilt lines carried 26.9 per cent., the two Pennsylvania lines 28.1 per cent., Lake lines carried 30,458 tons against 53,820 tons last week.

West Bound Trunk Line Shipments.

The figures following show the total freight, all rail, carried by all of the trunk lines out of New York City, to points Buffalo, Pittsburg, etc., and beyond, not including lake and rail, for the four weeks of November and the first week of December:

	1893.	1894.
November.	Tons.	Tons.
First week.....	20,510	22,714
Second week.....	30,414	39,380
Third week.....	27,528	45,245
Fourth week.....	19,188	22,792
December.		
First week.....	21,182	24,345

It will thus be seen that during November the total westbound tonnage, all rail, amounted to 130,091 tons this year compared with 97,640 last year. This is a favorable showing. The improvement has appeared during the last two months. Before that, 1894 was poorer than 1893, and for the year, the total will probably be 60,000 tons less than in 1893.